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June 1986

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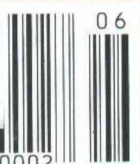
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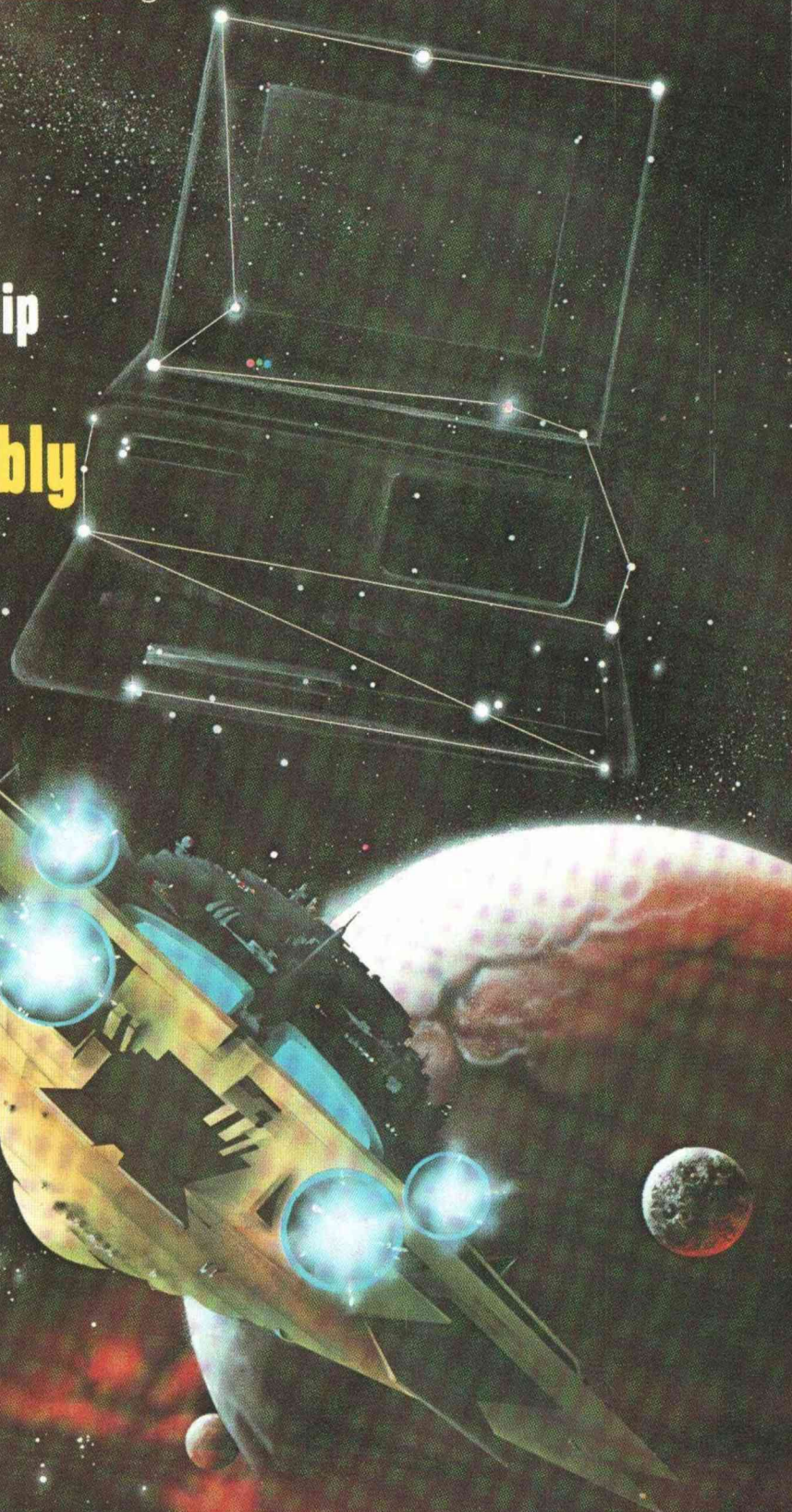
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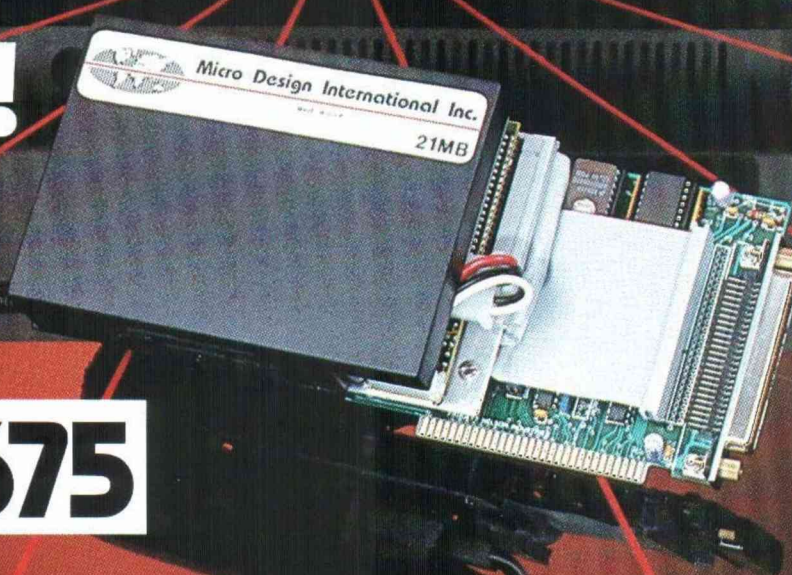
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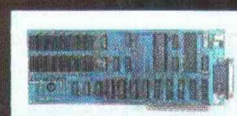
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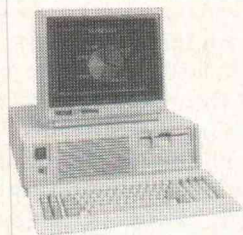


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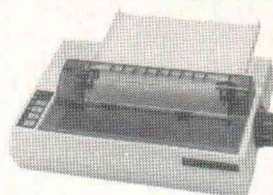
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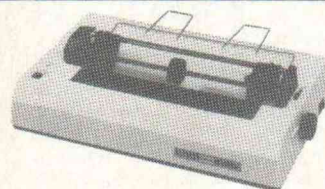
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Features

■ Barden's Buffer/ William Barden, Jr.	10
Create new video fonts on your Tandy PC	
Computer Dictionary/ John McCormick	25
The layperson's guide to hacker jargon	
The Integrated Desk/ Bobby Ballard	30
A look at DeskMate's Text function	
■ PC Phone Booth/ Leonard Hyre	33
Directory assistance without dialing 411	
BASIC Bytes/ Richard A. White	46
Exploring BASIC's control structures	
■ Star Trek/ John D. Shewchuk	50
The game that takes you "where no man has gone before"	
■ Metric Calculator/ Bob Mills	73
Converting measurements with PASCAL	
A Good PILOT for Lost Programmers/ John McCormick	84
An up-and-coming computer-aided education language	
■ Model 100 Machine Code Made Easy/ Michael R. Henning	86
Portable machine language programming	
Delphi Bureau/ Kevin Nickols	97
News from the PCM electronic connection	
■ Hitting the Right Keys/ John McCormick	98
Improve your numeric keypad skills	
■ Color Code Combo/ Dan Bishop	100
A new twist on a popular deductive reasoning game	

Departments

Advertisers Index	130
Back Issue Information	104
Bar Coded Listings	119
Letters to PCM	8
Lprint/ Lawrence C. Falk	6
Editor's Notes	
New Products	118
The Rackseller	130

Reviews

1-Hour Telecomputing/ IMPress/ Book	115
4N1-1000 Board/ Micro Mainframe/ 1000	104
The Banner Machine/ Cardinal Software/ 1000, 1200, 2000, 3000	105
BDL Roast/ BDL Homewares/ 1000, 1200, 2000, 3000	104
Electric Envelope/ MCTel/ 1000, 1200, 3000	117
KeyEntry III/ Southern Computer Systems, Inc./ 1000, 1200, 3000	111
Media Master Plus/ Intersecting Concepts/ 1000, 1200, 3000	114
MouseTop/ H&H Enterprises/ 1000, 1200, 2000, 3000	107
Odds Calculator/ Robert A. Nicolai/ 1000, 1200, 3000	106
PC Paintbrush/ Z-Soft, Inc./ 1000, 1200, 3000	102
SmartNotes/ Personics Corporation/ 1000, 1200, 3000	109
Timeslips/ North Edge Software/ 1000, 1200, 3000	112
Wishbringer/ Infocom/ 1000, 1200, 3000	113
X-TEL/ Siga/ 100, 200	116
Zuckerboard/ Advanced Transducer Devices, Inc./ 1000	109

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Characters per record	1679	1000	4608 ✓
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Indexes per file	1	7	12 ✓
Number of digits per numeric field	20	10	24 ✓
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Files span multiple drives	no	no	up to 8 ✓
FEATURES:			
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Full-screen facility for creating custom report layouts	no	no	YES ✓
Built-in field types (error checking)	no	3	12 ✓
User-defined field types	no	programmer required	200 ✓
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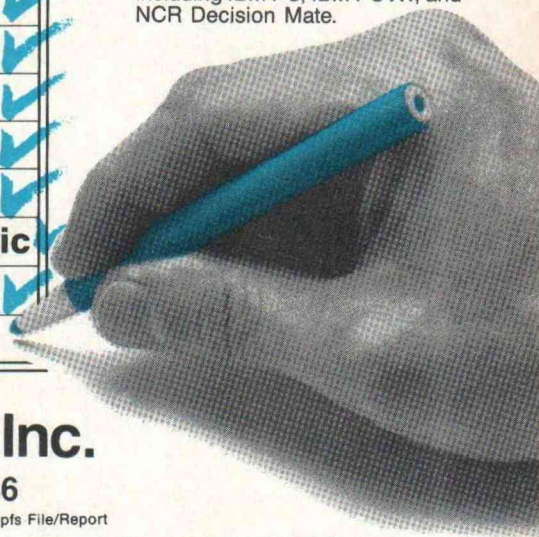


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Doing Derby with an Electronic Friend

*Oh, the sun shines bright on my Old Kentucky Home,
It's summer, the people are gay
The corn top's ripe and the meadow's in the bloom,
And the birds make music all the day!*

My Tandy 200 and I are taking in the Kentucky Derby this year. In fact, as I write this, the Derby is two days away and I have already loaded Federal Hill Software's *Handicapper* into memory so I'll be ready to make a "Spectacular Bid" to win some money rather than having to "Spend a Buck" at Churchill Downs.

Derby comes once a year in Louisville on the first Saturday in May. It's known as the "greatest two minutes in sports" because that is about how long it takes for 10 to 20 of the world's best three-year-old thoroughbred horses to make a mile and a quarter Run for the Roses. But that's just the part you see on TV: All week long is Derby Festival in Louisville — steamboat and balloon races, a "chow wagon" eating extravaganza, a parade and lots of other stuff. Does a lot of work get done the week of Derby? Of course not, but it is fun.

Some 100,000 people will cram Churchill Downs this year for Derby (here it is just "Derby," not "the Kentucky Derby," not "the Derby," or anything else. Just Derby). I wonder how many of them will bring along their 100s and 200s? And, if I may wax philosophical

for a bit, it seems fitting that computers affordable for everyone can play a part in an event called the sport of kings.

I'm going to give *The Handicapper* a shot at helping me make a winning bet in the Derby. In order to do that, I've reserved one bank for the program, while leaving my two others for Dr. Preble's programs *navComp II*. You see, I am also learning to fly and these programs are a great help in this endeavor.

The point of all this is that it certainly is interesting to be using computers for things in which I am interested — horse racing and flying. Here, the computers are just tools, not the end-all in themselves.

The fact is that it is a whole lot easier handicapping horses with a computer than doing so by hand. And it is a joy to plan and execute a flight plan using a computer program as opposed to figuring things out on a circular slide rule. Notice what I am saying: these computers have use — utility.

I am enjoying being exposed to that utility. And I am sure you are too.

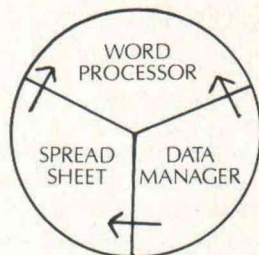
— Lonnie Falk

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Fontastic Printing

Editor:

As a Tandy 1000 owner, I encountered some difficulties when I tried to find a font utility program that would drive my DMP-110 printer. Neither Broderbund's *The Print Shop* nor Power Up's *The Printing Press* do the trick, and Unison's *PrintMaster*, which is listed in the new Tandy computer catalog, only drives the newer IBM-compatible printers put out by Tandy.

The solution to my search became ProSoft's *Fontasy*, an excellent program that drives all Tandy printers (and many others) and seems particularly well-mated to the 1000. For example, although ProSoft's documentation states that an IBM PC needs 512K memory to compose a full page in *Fontasy*, my 384K machine handles the job easily, possibly because of its built-in high resolution graphics.

Fontasy is a flexible program that can easily magnify, mirror, invert, etc., any of its fonts — and there are a lot of fonts available. The program also comes with a design system that allows a user to modify existing fonts or create new ones, and a template section that sets up and prints multicolumn pages with letterheads and even flows text around predefined graphics "windows" on the page. Then there's a graphics capability that draws free-hand or rubberband lines, rectangles and ovals (you can change the aspect ratio before fixing the oval on the page), and a fill option that includes 95 patterns. All of this is simply driven by a series of menus and mnemonic commands.

I heartily recommend *Fontasy* to Tandy 1000 owners who are looking for a font program that suits their computer, drives their printer and, at \$49.95, won't strain their wallet.

By the way, I have also devised a simple method for using the RAM3 dictionary in *Turbo Lightning* with a floppy disk — a trick I'd be happy to share with anyone who sends a self-addressed, stamped envelope to 1808 Whispering Hill, 37043.

Thomas A. Pallen
Clarksville, TN

Additions for the 'Wooing' Repertoire

Editor:

Hard disk users should take heed of John McCormick's advice on setting up subdirectories. ("Wooing Ms. DOS," April 1986, Page 79). It makes life so much simpler.

I would make two additional suggestions. The command `PROMPT &P$g` lets you know where you are all of the time by displaying the directory name. For instance, the root directory prompt would be `\>`, and the prompt for Mr. McCormick's subdirectory,

WORD, would be `\WORD>`. This prevents confusion when several subdirectories are used, and when changing back and forth between Drive C and Drive A.

The command can easily be set up, as described by Mr. McCormick, in the `AUTO EXEC.BAT` file. Try it by typing in the command and pressing ENTER. Then, if you like it, put it in the `AUTOEXEC.BAT` file. You'll wonder how you ever survived without it.

My second suggestion has to do with the `TREE` command, which is excellent for checking the status of your directories and paths. This command is omitted from the Tandy 2000 version of MS-DOS, but can be easily copied from a version that includes it. Typing `TREE` gives a directory of all your subdirectories and paths.

As a self-taught computer enthusiast, I find the issues of PCM an inexpensive, but valuable aid in my continuing education. This is one magazine I won't lend to friends for fear they might have it when I need it for reference. I just hand them a subscription card and tell them to get their own!

Irma Canfield
Franklinton, LA

Tandy Communication Connection

Editor:

For a year now, I have been receiving PCM every month. I am very well-taught on the use of my Tandy 100 and Tandy 1000. I read every page of the magazine and put to work any application program that is of concern to me.

I have one question: How do I set the parameters on my Tandy 100 and 1000 in order to have both computers communicate? I have the RS-232 interface board installed in the 1000.

Bernard Mongeau
Sillery, Quebec

Setting the communications parameters is actually the simplest step in getting two computers to communicate. The important thing to remember is the parameters are set the same on both machines. But, there is much more to communications than parameters.

The first step to getting two computers to communicate is finding communications software for both machines. The Telcom software built into the Tandy 100, and DeskMate, which comes with the 1000, aren't really the answer. To accurately transfer files between the two machines, you'll need software that supports XMODEM or some similar

error-checking protocol. Most Tandy 1000 terminal packages support XMODEM. For your Tandy 100, try Segia's X-Tel (reviewed in this issue).

Looking for Expansion Board

Editor:

In the February 1986 issue of PCM in the article "Upgrade Your Tandy 1000," you refer to a PBJ MFB-1000 memory expansion board. Please tell me how to receive information about the board, the manufacturer's name and address, the price and where I might purchase one.

Jan A. Hanson
Ramsey, MN

The MFB-1000 is available from PBJ Inc., 5725 Kennedy Boulevard, N. Bergen, NJ 07047, (201) 861-0126.

The Key You have Pressed . . . has been Changed . . .

Editor:

I wanted to let you know that I really appreciate the support you are providing to Tandy users, and to pass on a problem I have discovered with the GW-BASIC Version 2.02 (Tandy Version 1.01.00).

Here in Fairbanks our nearest source of reliable information is Seattle. All we have for support is provided by a local Radio Shack franchise that knows very little about the computers they sell. Your magazine provides valuable information.

The problem I discovered with the most recent version of BASIC is in the key trapping. The new version of BASIC does not recognize function keys F11 and F12 as 11 and 12. I was told by the software support people in Fort Worth that in an effort to make this version of BASIC more compatible with the IBM version of GW-BASIC, the function keys F11 and F12 are now assigned 21 and 22. The keys for the purpose of key trapping are now numbers 1 through 10, as F1 through F10. The cursor control keys are assigned: up = 11, left = 12, right = 13, down = 14, and F11 and F12 are now 21 and 22, respectively. I stumbled onto this trying to run the *Sketch* program from your October 1985 magazine (Page 10). I hope this may be of help to others who have realized there is a problem, but were unable to track down the cause.

Jerald L. Coffman
North Pole, AK

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Not satisfied with just the old Alphabet? Here's how to make your computer multi-lingual

What a Bunch of Characters!

By William Barden, Jr.

You'd think that the subject of video characters would be cut and dried, wouldn't you? However, there are some interesting and amazing things that can be done with Tandy MS-DOS machines vis-a-vis video characters. I was surprised to discover that you can add any number of your own text or special characters to BASIC (or other) programs — you can *easily* add a full set of Cyrillic or Arabic characters for video display, for example, and you could have dozens of sets of characters in RAM or on disk ready at your beck and call. I'm not talking about laboriously constructing characters in graphics, either. You can use a statement such as this to print out three custom tailored characters:

```
100 PRINT CHR$(133)+CHR$(
    (137)+CHR$(200)
```

In the process of researching this topic, I came up with some other tricks and techniques worth mentioning, including textures and form characters for video, and a way to produce virtu-

ally any size character from the built-in set of MS-DOS characters. Interested? Read on.

The Standard Set of Characters

I shouldn't tell you this (you may know already), but the Tandy 1000 is really just an IBM PCjr in wolf's clothing. In fact the 1000 looks virtually identical to the PCjr as far as graphics, sound and architecture. Of course, the 1000 is what the PCjr *should* have been — a machine with an excellent keyboard, more than one disk drive, hard disk and other expandability. My point in mentioning this is that PCjr and PC *technical* documentation is excellent (and available), and can be used (with some caution) to find out what's happening in the Tandy 1000, 1200, or 3000.

Tandy MS-DOS systems use the same character set as the IBM machines. As you know, ASCII characters are used as a base. Standard ASCII characters make up the first 128 characters from zero to 127 decimal — they use a seven-bit code, as shown in Figure 1.

The characters from 32 decimal to 127 are common alphabetic, numeric and special characters. Even though the ASCII code is supposed to be standard, you'll find some variations in some of these codes on various printers and systems. But we'll use the IBM/Tandy codes as gospel. The codes from zero through 31 are the so-called "control codes." Generally, these codes are not printable. They provide for data com-

William Barden, Jr. is a master communicator in a field in which he is one of the few recognized experts — microcomputers. A prolific author of more than 27 books on computers and computer programming, Bill also has authored several instructional software projects for Tandy/Radio Shack.

Figure 1. ASCII Characters

		Leading Hex Digit							
		0	1	2	3	4	5	6	7
Trailing Hex Digit	0	null	DLE	space		@	P	.	p
	1	SOH	DC1	!	1	A	Q	a	q
	2	STX	DC2	"	2	B	R	b	r
	3	ETX	DC3	#	3	C	S	c	s
	4	EOT	DC4	\$	4	D	T	d	t
	5	ENQ	NAK	%	5	E	U	e	u
	6	ACK	SYN	&	6	F	V	f	v
	7	BEL	ETB	'	7	G	W	g	w
	8	BS	CAN	(	8	H	X	h	x
	9	HT	EM	)	9	I	Y	i	y
	A	LF	SUB	*	:	J	Z	j	z
	B	VT	ESC	+	;	K	[	k	{
	C	FF	FS	,	<	L	\	l	|
	D	CR	CS	-	=	M	]	m	~
	E	SO	RS	.	>	N	^	n	
	F	SI	US	/	?	O	_	o	

127 Decimal

Control Codes Special Characters/Digits Upper Case/Special Characters Lower Case/Special Characters

example, allows you to embed control characters in the text. The funny faces and other characters display in the text and can be used to control special printer functions such as underlining and boldface.

It would be interesting to read the internal IBM memos to see how and why some of the glyphs were chosen — why both a normal and inverse video funny face, for example? Why card suits? Why not an IBM logo, to really put their stamp on things?

The Alternate Character Set

A seven-bit code such as ASCII leaves 128 unused code values in an eight-bit byte, values from 128 through 255. Various manufacturers have tried their hand at special codes in this group. Fortunately, reason prevailed at IBM, and minuscule profiles of the top 128 IBM executives *were not* used in this sequence, although it was a close decision. Instead, the characters shown in Figure 2 were implemented.

The first group of these characters represent foreign characters such as umlauts (ü) and commonly used characters not in the basic 128, such as the British pound sign (£) and one-half and one-quarter fractional signs. These are followed by gray shading characters,

Figure 2. Alternate Characters

		Leading Hex Digit							
		0	1	2	3	4	5	6	7
Trailing Hex Digit	0	C	E	a'	☐	L	F	a	≡
	1	ü	æ	i'	☐	⊥	||	β	±
	2	é	Æ	o'	☐	⊥	⊥	π	≤
	3	â	ô	u'	|	⊥	⊥	Σ	∩
	4	ä	ö	n(N)	⊥	⊥	⊥	σ	∪
	5	·a	ó	N	⊥	+	⊥	μ	∩
	6	â	û	a	⊥	⊥	⊥	γ	∩
	7	ç	ú	o	⊥	⊥	⊥	ϒ	∩
	8	ê	ÿ	z	⊥	⊥	⊥	Q	o
	9	ë	Ö	⊥	⊥	⊥	⊥	⊖	•
	10	é	Ü	⊥	⊥	⊥	⊥	Ω	•
	11	ï	¢	½	⊥	⊥	■	δ	∩
	12	î	£	¼	⊥	⊥	■	φ	∩
	13	í	¥	i	⊥	⊥	■	⊖	2
	14	Ä	⊥	»	⊥	⊥	■	⊥	■
	15	Å	f	»	⊥	⊥	■	⊥	■

255 Decimal

Foreign Characters Texture/Line Segments, Blocks Greek Symbols/Math Symbols

munication actions such as ESC (Escape), SOH (Start of Header), and EOT (End of Transmission). Also in the control codes are the necessary Carriage Return code (13), Line Feed (10), Form Feed (12) and other formatting codes.

Most of the 128 ASCII codes can be displayed on the screen. The normally-printable codes are displayed by simply including them as standard text characters:

```
100 PRINT "Insert 25 cents
to continue with MS-DOS"
```

IBM assigned characters for many control codes — an ASCII one (normally SOH) prints as a happy face, for example, and an ASCII eight (normally BS or Backspace) prints as a small diskette. To print these codes, you can use a CHR\$ statement in a BASIC program or special prefixes in other languages (Chr in Turbo PASCAL, for instance):

```
100 PRINT "Have a nice day
";CHR$(1);". . . dummy"
```

Various programs have different ways of displaying some of the codes — the *My Word!* word processor, for

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Figure 3

```
Ok
list 1000-1030
1000 PRINT "
1010 PRINT "
1020 PRINT "
1030 PRINT "
Ok
```

ID Number	Item

1LIST 2RUN+ 3LOAD" 4SAVE" 5CONT+ 6,"LPT1 7TRON+ 8TROFF+ 9KEY 0SCREEN

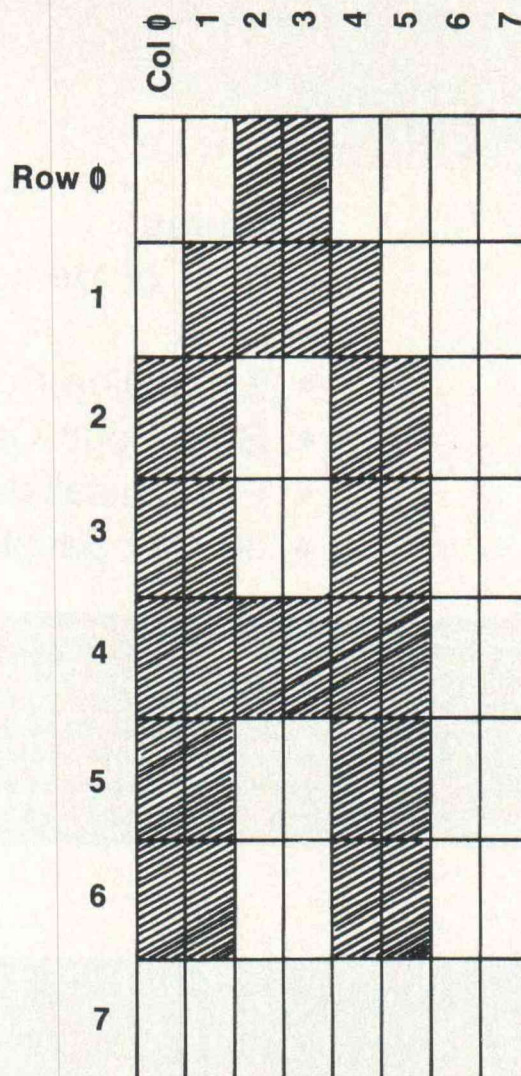
form characters, block graphic characters, a portion of the Greek alphabet and mathematical symbols.

All of these characters can be entered directly from the keyboard by holding down the ALT key and then entering the character code from the numeric keypad. To display the line segment (⌘), for example, you'd press ALT and then enter 215.

The problem with most of these characters is that many software packages and printers are not equipped to handle them, even though they can be displayed on the screen. I have an older Radio Shack DMP-2100 as my main printer for a Tandy 1000 and IBM PC and an IBM Graphics printer on my PCjr. The DMP-2100 doesn't recognize the expanded character set and ignores characters that display on the screen or prints a different character. The IBM Graphics printer prints any character that can be displayed on the screen because it is designed that way. Any newer printer that is MS-DOS compatible will also print any of the 256 screen characters, including Tandy printers, of course.

Displaying the characters in the alternate character set is ideal, because it eliminates the messy CHR\$ coding in favor of actually seeing what will be printed. An example is the code segment shown in Figure 3, which shows a portion of a form that is constructed using the line segments in the alternate character set and entered directly from the keyboard with the ALT key and numeric keypad. Being able to display the form on the screen allows you to easily position and align the characters,

Figure 4. Eight by Eight Pixel Encoding

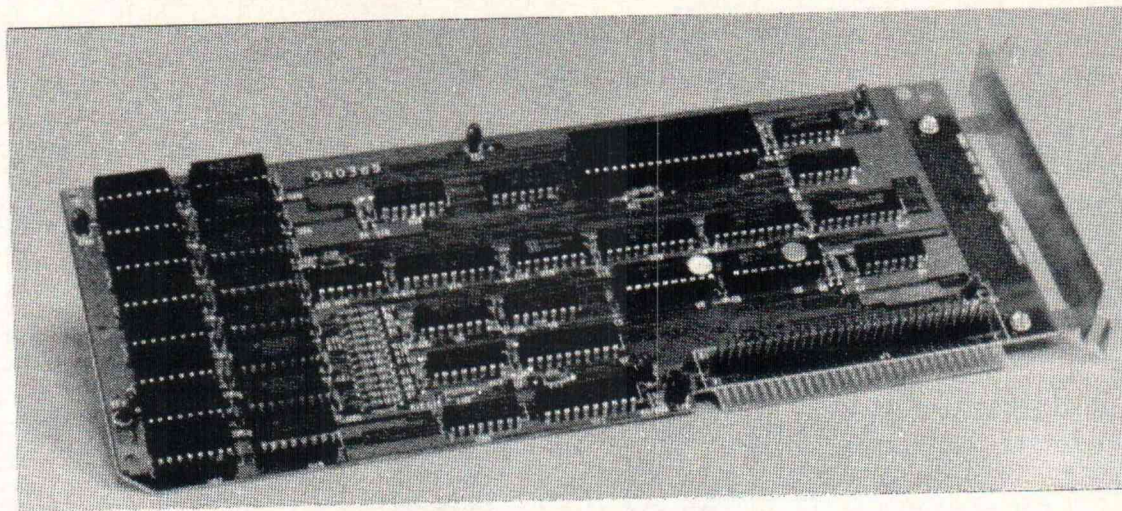


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either for display or printing.

The texture characters are often overlooked in the alternate character set. Characters 176, 177 and 178 provide a dot texturing of the entire character position. They can be used to simulate colors on monochrome displays for such things as bar graphs.

Characters in the Graphics Mode

One of the nice things about MS-DOS systems is that both graphics and text can be intermixed. This was not so in many earlier computer systems. In the text mode of BASIC (SCREEN 0) the screen characters, including the alternate characters, are formed by a ROM character generator. This is a chip that contains all of the patterns for the characters; each character is encoded in 8-by-8 pixel form, as shown in Figure 4. (The monochrome adapter used on the PC series and Tandy 1200 actually generates a higher resolution 9-by-14 pixel character.)

In graphics modes, characters are not generated by the ROM character generator, but by the system BIOS, the firmware that drives input and output devices for MS-DOS. This implementation allows mixing both text and graphics.

The characters are generated from a table of characters in the BIOS firmware in high memory. To get at these characters from BASIC and other languages, it's necessary to use the DEF SEG statement.

Segment Addressing

PC machines such as the Tandy 1000 allow a total of 1,048,576 bytes of memory to be addressed — the addressing space of the 8088 microprocessors used in the IBM PC, Tandy 1000 and Tandy 1200. This addressing space is divided up into RAM (user memory), ROM (system BIOS) and dedicated addresses, as shown in Figure 5.

The 8088 was an offshoot of the 8080/8085 microprocessors which were geared towards a 65,535 byte (64K bytes) addressing space. To maintain compatibility with the older microprocessors, the 8088 uses the notion of *segments*. Segments divide the addressing space into 64K blocks. Within the blocks, any of the 64K bytes can be addressed by an *offset address* of zero through 65,535. To address another part of memory, a *segment register* is changed to point to another block. (That's the basic scheme, although a little bit simplified.)

BASIC uses its own 64K block for

Figure 5. Memory Layout and Segment Addressing

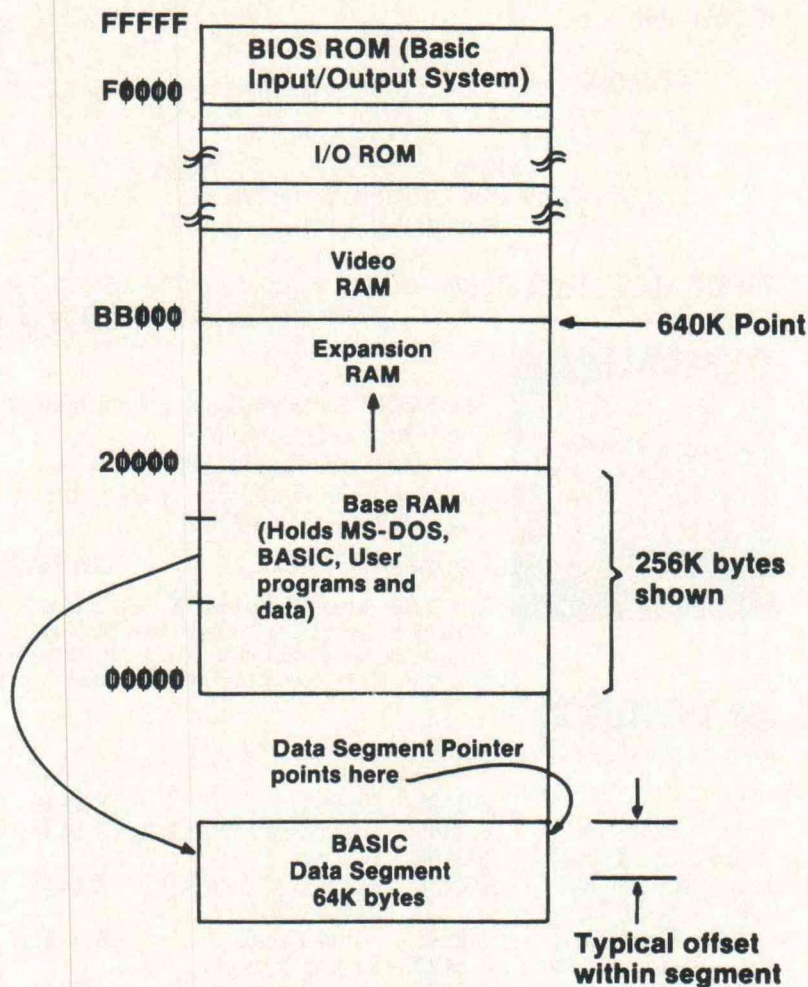
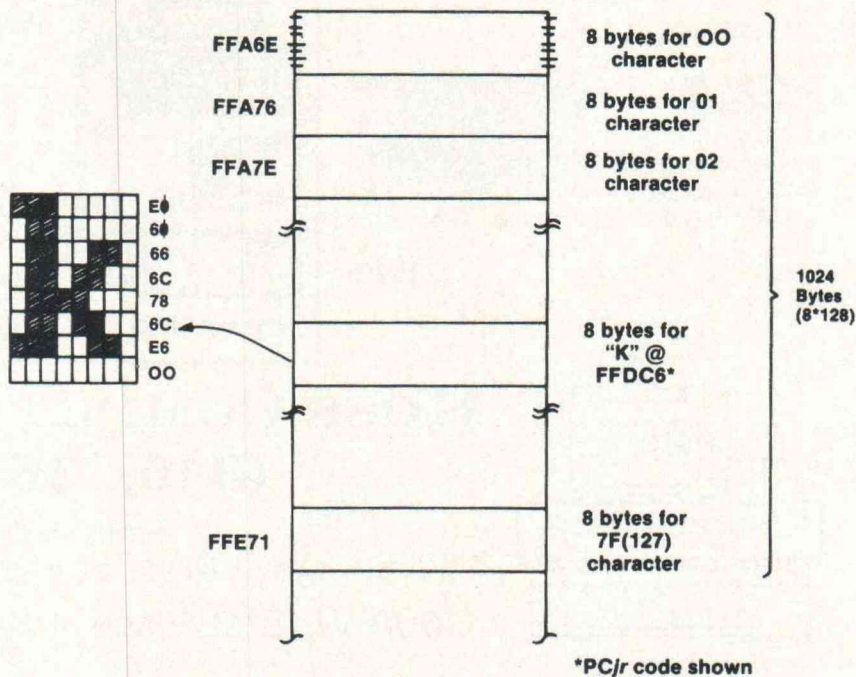


Figure 6. BIOS Character Table



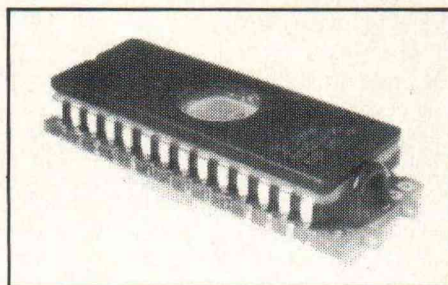
*PCjr code shown

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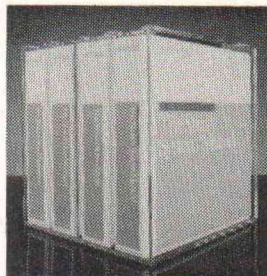
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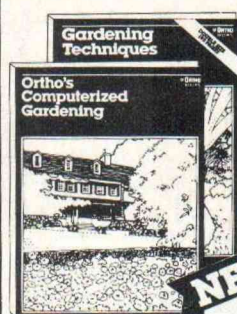
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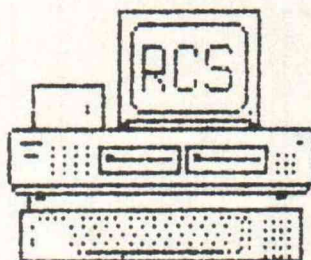


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storage of program and data variables. However, any portion of memory can be addressed in BASIC by changing the data segment register with the DEF SEG command. DEF SEG uses an address of zero through 65,535 (hexadecimal 0000 through FFFF). The actual physical address generated from the segment address adds a hexadecimal zero on the right — DEF SEG &HF000, for example, becomes &HF0000. Once the segment address is specified, any of the 64K bytes within the segment can be accessed by PEEKs and POKEs and other BASIC statements. A DEF SEG without an operand sets the data segment register back to the original value of BASIC's data segment.

Location of the Characters

In the basic PC (Tandy 1200), only the first 128 characters are allowed in graphics. However, in the PCjr and Tandy 1000, all of the 256 possible characters are permitted. We'll address ourselves to the PCjr/Tandy 1000 configuration here. The first set of 128 characters — the standard ASCII — is found at physical address &HFFA6E in ROM BIOS. Each character is made up of eight bytes containing eight bits per byte, as shown in Figure 6. The 64 bits make up the 64 pixels of the character as shown in the figure. As there are 128 characters in the first set, the table is 128 by eight, or 1,024 bytes long.

The second portion of the table is located at physical address &HFC070 in Tandy BIOS. The arrangement of the characters here is the same as in the first set — eight bytes per character.

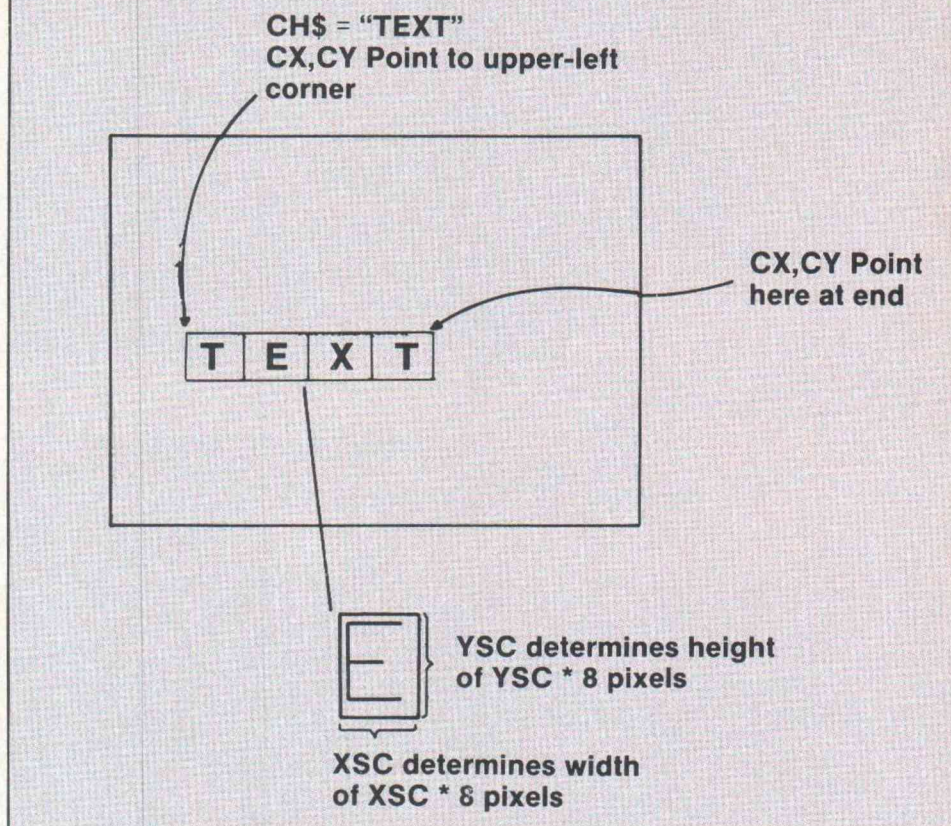
A Character Expander

To print a character, the BIOS software looks at the character code, accesses the character table, and then prints the dots that make up the character. In the 640-by-200 resolution mode, for example, eight rows of eight columns are printed for each character.

We can take advantage of the built-in character table to accomplish interesting things. One possibility is shown in Listing 1. This is a graphics subroutine that allows expanded characters to be displayed. The basic approach here is to pass the subroutine a string of characters to be displayed along with the display position and scale factor, as shown in Figure 7.

The scale factor allows characters to be stretched vertically or horizontally, as shown in Figure 8. To incorporate the subroutine in your own BASIC programs, pass it the string as CH\$, the 'X'

Figure 7. Character Expander Parameters



and 'Y' scale factors as XSC and YSC and the upper left corner of the starting character position as CX,CY. The only disadvantage of the subroutine is that it's rather slow. However, compiling the BASIC code speeds things up by a factor of about 10.

The subroutine works as follows: An individual character is stripped from the CH\$ string from left to right. For each character in the string, the corresponding ASCII code is found by the ASC function. The ASCII code is used to find the dot-matrix form of the character in the BIOS table and move the eight bytes to the array Z.CHX.

The 64 bits of the dot-matrix form are now scanned a row at a time. For each row scanned, there are eight columns, found by counting Z.X from zero to seven and using $2^{(7-Z.X)}$ as an AND value to find whether the pixel should be on or off. The SGN function just sets Z.PIX to a zero or one for a two-color mode representation of the character. Change this for four-color graphics.

Each pixel position is repeated the number of times defined by XSC, expanding the character widthwise. Each row is repeated based upon YSC, expanding the character lengthwise.

At the end of the display, CX and CY

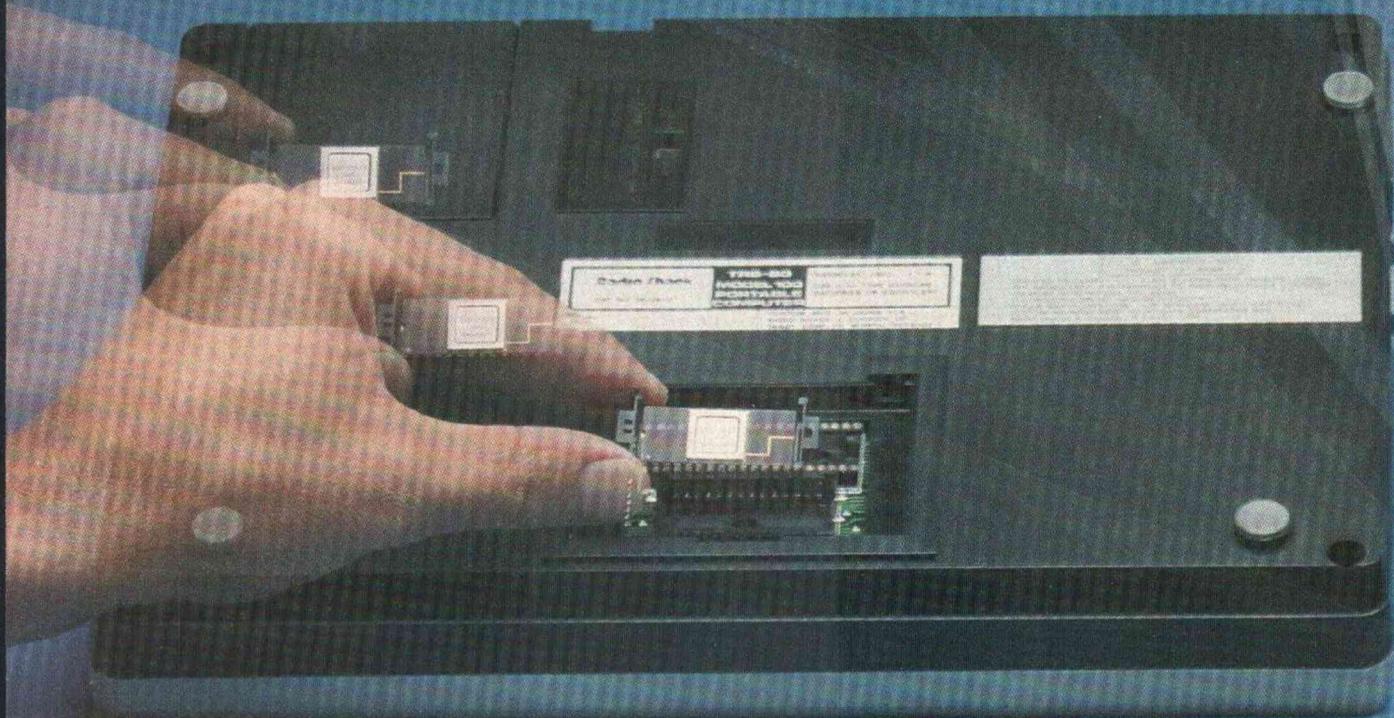
are adjusted to point to the upper left-hand corner of the next screen "character position," based upon the size of the character in the expanded mode.

Creating Your Own Character Set

All of this leads us to the main point of this column — how to add your own characters. The ROM BIOS is meant to be used as a standard way of performing system functions. It contains a set of routines to handle all system I/O — scrolling the screen, communicating with the RS-232C port, and so forth. The code has a lot of "hooks" in it to allow a systems programmer to add extensions and change things around in an orderly fashion. BIOS uses a set of software interrupt vectors located in low memory — way down in Segment Zero. Instead of jumping directly to an I/O handler in ROM, a programmer should make a system call via a software interrupt, which would then route the call to the proper BIOS routine.

Interrupt vectors in ROM look like Figure 9. They are four bytes long and consist of a segment address and an offset. The segment address and offset define a BIOS memory location for the function.

Both the standard ASCII characters



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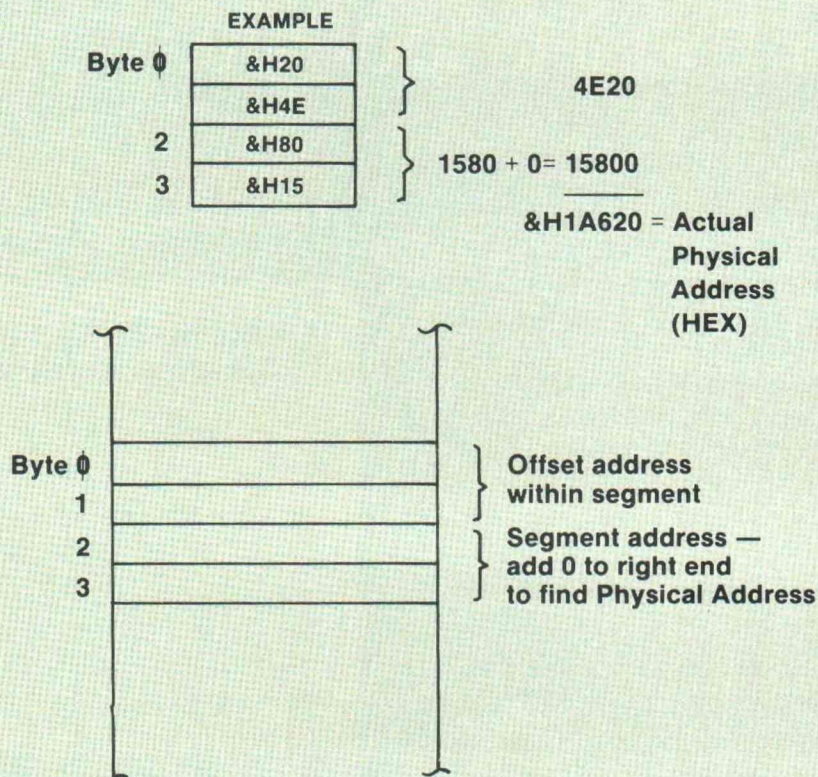
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Figure 8

Tandy
Tandy
Tandy
Tandy

1LIST 2RUN+ 3LOAD" 4SAVE" 5CONT+ 6,"LPT1 7TRON+ 8TROFF+ 9KEY 0SCREEN

Figure 9. Interrupt Vector Format



and alternate character set have pointers that look like the interrupt vectors of the figure. The pointer to the standard character set is located at &H110 through &H113, and the pointer to the alternate character set is located at &H7C through &H7F. The original PC type systems allowed only the first 128 characters to be displayed in graphics mode. However, they also permitted the user to put in a pointer to his own alternate character set in graphics mode. Later systems, such as the PCjr and Tandy 1000, allowed all 256 characters in graphics mode, but kept the pointers. In fact, then, we can simply substitute our own character set by changing the pointers — say the pointer to the alternate character set.

To see how this works, load BASIC and enter the commands in Figure 10.

Figure 10

```
Ok
SCREEN 2
Ok
DEF SEG=0: PRINT PEEK (&H510):
PRINT PEEK(&H511): DEF SEG
xxxx (typically 128)
yyyy (typically 21)
Ok
CLEAR ,19999
```



```

Ok
DEF SEG=0: POKE &H7C,32:
  POKE &H7D,78: POKE &H7E,xxxx:
  POKE &H7F,yyyy
Ok
DEF SEG
Ok
FOR I=20000 TO 20007:
  POKE I,&HA0: NEXT
Ok
PRINT CHR$(128)

```

The xxxx and yyyy are the addresses obtained from the first PEEKs and represent the data segment address of BASIC. They are put into the alternate character set segment pointer addresses. The offset is set to 20,000, meaning the 20,000th location within BASIC, a free area, protected by the CLEAR ,19999 statement.

If you did this sequence correctly, you will see a pair of vertical lines displayed after the PRINT CHR\$(128). What you've done is to change the location of the alternate character set to a protected

memory area within the BASIC 64K segment. As each character takes up eight bytes, creating a table of 1,024 bytes will give you a new set of alternate characters, one that can be changed at will. You could, for example, do BSAVES and BLOADs in BASIC to save and reload the 1,024-byte memory area with any new character sets you wish. You could even define larger patterns made up of several characters, although this is probably better done in standard graphics.

The beauty of the alternate character method is that you can use a CHR\$ with a value of 128 through 255 instead of a set of graphics commands to print the character. Once the set is defined, you can also use the ALT key method of entry on the screen.

How Do You Edit the Characters?

There is a problem, though. How can you easily create the characters to be used? What's really needed is a charac-

ter editor. By a lucky stroke of fate, I just happen to have one here. (See Listing 2.)

The character editor is not a new idea. I saw a version of it on an ACT Apricot system, an MS-DOS machine with tiny diskettes, a small "footprint," and a huge price several years ago. The basic display is shown in Figure 11.

The 128 characters of the alternate set are displayed at the bottom of the screen, referenced by code. Initially, these characters will be garbage, as the pointer points to a character work area at an offset of 20,000 within BASIC.

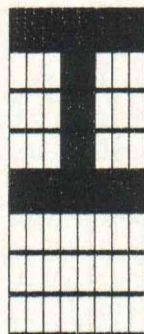
There are three basic functions — saving a new file, loading an old file, and editing a character. The editing function is the guts of the program.

If you've selected the character edit, the current character is displayed in an 8-by-8 matrix in the middle of the screen. This matrix is designed to resemble the actual screen dimensions of the character as much as possible. The

Figure 11

GRAPHICS EDITOR

1. Read in old file
 2. Save characters in file
 3. Edit character
- Arrows=move; I=Ink toggle; Q=Quit



	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
128 to 159																																
160 to 191																																
192 to 223																																
224 to 255																																

screen has an aspect ratio of four units horizontally to three units vertically. In 80-character mode each character is $\frac{4}{80} = \frac{1}{20}$ unit wide by $\frac{3}{25}$ unit high, making the aspect ratio of a character one to 2.4.

During the edit mode, you can move a cursor by the up arrow, down arrow, right arrow and left arrow keys. A small dot in the middle of each of the 64 rectangles marks the position of the cursor. Pressing the I key sets or resets an "ink" mode. If ink is on, the rectangle within the square is filled in. If ink is off, no filling in is done.

As the character is drawn on the matrix, you'll also see it reproduced in the proper position at the bottom of the screen. The large display is good for defining the character, but the small display is necessary to see what it actually looks like on the screen.

Pressing Q quits the character edit mode and returns you to the short main menu from which another character can be selected for edit.

The current set of characters can be saved at any time in any file you wish to name. (If no extension is used, BASIC uses a .BAS extension.) A file can be added to or edited by reloading an old file, changing it, and rewriting it under the same or a different name.

Once the character sets are defined, you can easily invoke them from your

own program without using the character editor. Just change the &H7C through &H7F locations as in the graphics editor to point to your own memory area or the memory area used in the graphics editor. The &H7E and &H7F locations must be changed to the location of BASIC's data segment as in the editor. The &H7C and &H7D must be changed to point to the offset within BASIC as before. See Listing 3.

BLOAD "name",xxxxx

The xxxxx offset parameter is not necessary if you're loading the character set into the same area that was used in creating the data. If you're loading into another area, use the offset of the area in the BLOAD command.

As many BLOADs as necessary can be done with as many character sets as you've defined. Within the BASIC pro-

Listing 3:

```
100 CLEAR ,19999!
110 BUFFER = 20000!
120 SCREEN 2
130 DEF SEG = 0: POKE &H7E, PEEK(&H510):
    POKE &H7F, PEEK(&H511): POKE &H7C,
    BUFFER - INT(BUFFER/256)*256: POKE &H7D, INT(BUFFER/256)
140 DEF SEG
```

Prior to loading in a character set, the memory area to be used must be protected by the CLEAR ,xxxxx statement. This prevents BASIC from clobbering the character data as it uses memory for stack and string storage. Any convenient area that can be protected can be used, dependent upon the size of memory in your system, size of BASIC program and so forth. The one used in Listing 3 is usable with a 128K system.

The character set is loaded by a BLOAD command of the form

gram, use the character set by CHR\$ statements with values of 128 through 255.

And that's the story of how to add any number of characters to your graphics screens. A little manipulation with pointers and some creative editing for the character set, and you have Japanese Kata-Kana or your own special characters. There are other tricks that can be used for character generation and we'll use some of them in future columns. See you next month. □

Listing 1:

```
100 ' Sample driver for Character Expander
110 SCREEN 2
120 CLS
130 CH$ = "Tandy": CX = 100: CY = 20: XSC = 2: YSC = 2: GOSUB 10000
140 CH$ = "Tandy": CX = 100: CY = 40: XSC = 4: YSC = 2: GOSUB 10000
150 CH$ = "Tandy": CX = 100: CY = 60: XSC = 8: YSC = 2: GOSUB 10000
160 CH$ = "Tandy": CX = 100: CY = 80: XSC = 10: YSC = 6: GOSUB 10000
170 GOTO 170
180 '
190 '
10000 '=====
10010 ' Character Expander Subroutine
10020 ' Input: CH$ = Character string
10030 '      CX = current x position
10040 '      CY = current y
10050 '      XSC = x scale factor - 1 to n
10060 '      YSC = y scale factor - 1 to n
10070 ' Output: CX = updated
10080 '      CY = updated
10090 '-----
10100 DEF SEG = &HF000
10110 FOR Z.SI = 1 TO LEN(CH$)
10120 CH = ASC(MID$(CH$,Z.SI,1))
```



```

10130 FOR Z.I = 0 TO 7
10140   Z.CHR(Z.I) = PEEK(&HFA6E + CH*8 + Z.I)
10150 NEXT
10160 FOR Z.Y = 0 TO 7: FOR Z.J = 1 TO YSC: FOR Z.X = 0 TO 7: FOR Z.X = 0 TO 7
10170   Z.PIX = SGN(Z.CHR(Z.Y) AND 2 ^ (7 - Z.X))
10180   FOR Z.I = 1 TO XSC: PSET (CX, CY), Z.PIX: CX = CX + 1
10190   NEXT: NEXT: CX = CX - XSC * 8: CY = CY + 1: NEXT: NEXT: NEXT
10200   CX = CX + XSC * 8: CY = CY - YSC * 8
10210 NEXT Z.SI
10220 DEF SEG: RETURN
10230 '=====

```

Listing 2:

```

1000 '=====
1100 '                               Character Editor Program
1200 '                               -----
1300 '-----
1400 CLEAR ,19999!                  'change these as required
1500 BUFFER = 20000!                ' " " " " "
1600 SCREEN 2
1700 KEY OFF: ON ERROR GOTO 3430
1800 DEF SEG = 0: POKE &H7E, PEEK(&H510): POKE &H7F, PEEK(&H511):

      POKE &H7C, BUFFER - INT(BUFFER/256)*256: POKE &H7D, INT(BUFFER/256)
1900 DEF SEG
2000 CLS
2100 LOCATE 1, 25: PRINT "G R A P H I C S   E D I T O R"
2200 LOCATE 3, 27: PRINT "1. Read in old file"
2300 LOCATE 4, 27: PRINT "2. Save characters in file"
2400 LOCATE 5, 27: PRINT "3. Edit character"
2500 LOCATE 17, 16
2600 '-----
2700 PRINT "0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1"
2800 FOR Z.I = 0 TO 3
2900   LOCATE 19 + Z.I * 2, 1: PRINT USING "### to ###"; Z.I * 32 + 128,

      Z.I * 32 + 159;
3000 NEXT Z.I
3100 FOR Z.I = 0 TO 3
3200   LOCATE 19 + Z.I * 2, 16
3300   FOR Z.J = 0 TO 31
3400     PRINT CHR$(128 + Z.I * 32 + Z.J) + " ";
3500   NEXT Z.J
3600 NEXT Z.I
3700 LOCATE 6, 20: PRINT "
3800 LOCATE 6, 30: PRINT "Your choice: "
3900 A$ = INKEY$: IF A$ = "" THEN 390 ELSE Z.RES = VAL(A$)
4000 IF Z.RES < 1 OR Z.RES > 3 THEN 370
4100 ON Z.RES GOTO 1020, 2020, 3010
1000 '-----
1010 ' 1. Read in Old File
1020 LOCATE 6, 20: PRINT "
1030 LOCATE 6, 30: INPUT "Input File: ", Z.RES$
1040 IF Z.RES$ = "" THEN 370
1050 BLOAD Z.RES$
1060 GOTO 310
2000 '-----

```



```

2010 ' 2. Save Characters in File
2020 LOCATE 6, 20: PRINT "
2030 LOCATE 6, 30: INPUT "Output File: ", Z.RES$
2040 IF Z.RES$ = "" THEN 370
2050 BSAVE Z.RES$, BUFFER, 1024
2060 GOTO 370
3000 '-----
3010 ' 3. Edit Character
3020 FOR Z.I = 7 TO 15
3030     LOCATE Z.I, 30: PRINT "
3040 NEXT Z.I
3050 LOCATE 6, 24: PRINT "
3060 LOCATE 6,24: INPUT "Character number (128 - 255): ", Z.RES
3070 IF Z.RES < 128 OR Z.RES > 255 THEN 3050
3080 FOR Z.I = 0 TO 8
3090     LINE (281, Z.I * 8 + 55) - (345, Z.I * 8 + 55)
3100 NEXT Z.I
3110 FOR Z.I = 0 TO 8
3120     LINE (Z.I * 8 + 281, 55) - (Z.I * 8 + 281, 119)
3130 NEXT Z.I
3140 FOR Z.R = 0 TO 7
3150     Z.CH = PEEK(BUFFER + (Z.RES - 128) * 8 + Z.R)
3160     FOR Z.C = 0 TO 7
3170         Z.PIX = Z.CH AND 2^(7 - Z.C)
3180         IF Z.PIX <> 0 THEN PAINT (Z.C * 8 + 285, Z.R * 8 + 59)
3190     NEXT Z.C
3200 NEXT Z.R
3210 LOCATE 6, 24: PRINT "
3220 LOCATE 6, 24: PRINT "Arrows=move; I=Ink toggle; Q=Quit";
3230 Z.X = 317: Z.Y = 91: Z.I = 0: PSET (Z.X, Z.Y)
3240 IF Z.I = 1 THEN LINE (Z.X - 3, Z.Y - 3) - (Z.X + 3, Z.Y + 3),1,BF

    ELSE LINE (Z.X - 3, Z.Y - 3) - (Z.X + 3, Z.Y + 3),0,BF
3250 IF Z.I = 0 THEN PSET (Z.X, Z.Y)
3260 Z.CH = PEEK(BUFFER + (Z.RES - 128) * 8 + (Z.Y - 59) / 8 )
3270 IF Z.I = 1 THEN Z.CH = Z.CH OR 2 ^ (7 - (Z.X - 285) / 8) ELSE

    Z.CH = Z.CH AND (255 XOR 2 ^ (7 - (Z.X - 285) / 8 ))
3280 POKE (BUFFER + (Z.RES - 128) * 8 + (Z.Y - 59) / 8 ), Z.CH
3290 LOCATE 19 + INT((Z.RES - 128) / 32 ) * 2, 16 + (Z.RES AND &H1F) * 2
3300 PRINT CHR$(Z.RES);
3310 Z.A$ = INKEY$: IF Z.A$ = "" THEN 3310
3320 IF Z.A$ = "i" OR Z.A$ = "I" THEN Z.I = Z.I XOR 1 ELSE 3340
3330 GOTO 3240
3340 IF LEFT$(Z.A$,1) <> CHR$(0) THEN 3410
3350 Z.A$ = RIGHT$(Z.A$, 1)
3360 IF Z.I = 0 THEN PRESET (Z.X, Z.Y)
3370 IF Z.A$ = CHR$(77) THEN IF Z.X <> 341 THEN Z.X = Z.X + 8: GOTO 3240
3380 IF Z.A$ = CHR$(75) THEN IF Z.X <> 285 THEN Z.X = Z.X - 8: GOTO 3240
3390 IF Z.A$ = CHR$(72) THEN IF Z.Y <> 59 THEN Z.Y = Z.Y - 8: GOTO 3240
3400 IF Z.A$ = CHR$(80) THEN IF Z.Y <> 115 THEN Z.Y = Z.Y + 8: GOTO 3240
3410 IF Z.A$ <> "q" AND Z.A$ <> "Q" THEN 3240 ELSE 370
3420 '-----
3430 ' Error trap
3440 IF ERR = 53 THEN LOCATE 6,22: PRINT "File not fnd. Press a key to continue"

    ELSE ON ERROR GOTO 0: RESUME
3450 A$ = INKEY$: IF A$ = "" THEN 3450 ELSE RESUME 370
3460 '=====

```


com·put·er dic·tion·ar·y

By John McCormick

Those new to computing (and some of us who aren't so new) often feel frustrated by all the strange computer terms found in articles and especially in advertisements. Every field, whether philosophy, astronomy, automobile mechanics or computer science, develops its own sub-language to make communication easier. Because English (or other languages) has no term to describe a new invention like a microchip, new words are created.

In a like manner, some English-named things or procedures have such long names that constant repetition in speech or writing is awkward (DSDD, for example, stands for Double-Sided Double-Density). Some people complain about all the computer jargon while discounting the fact that we use all kinds of jargon in our daily lives. There simply isn't any other reasonable way to communicate the concepts involved in computing without its use, so anyone interested in the field needs an understanding of some of these exotic terms.

I will describe what I have found to be some of the most confusing terms. You probably know many of them already, but even some you understand may not mean exactly what you thought, so take a quick look at the list even if you are an experienced user. These examples come from Tandy's catalogs, PCM ads and articles and my own experience. The list is partially alphabetic, although similar items are grouped together. While definitions are given for some terms, for others I only explain what they mean to you rather than give a technical definition.

Algorithm — The actual method the computer uses to obtain the answer to (usually) a math problem. Your computer doesn't contain tables of sine, tangent and logarithms. What it does have is a way to simply calculate the required number, in other words, an algorithm. For example, an algorithm for 5 times 10 is $10 + 10 + 10 + 10 + 10$, although the computer does this in binary.

BASIC — Stands for Beginner's All-purpose Symbolic Instruction

John McCormick started programming in 1965 while majoring in physics in college, and was formerly employed with Wang Labs. He has written several reviews for THE RAINBOW.

Code. There, now do you feel better about having some difficulty learning such a basic sounding language?

Bug — The term “bug” comes from the early days of computing when actual insects would get inside the computer and cause problems. Today this is unlikely to occur, but it isn’t unlikely that you will discover programs full of bugs, which cause lots of problems and are as difficult to eliminate as any mosquito. A bug is a programming error.

Benchmark — A term you will often hear used when describing the relative merits of different computers. A benchmark is simply a standard program that is run on a number of different machines (or using a number of different pieces of software on the same machine). The relative speeds can then be directly determined by comparing the time required to execute (see execute) in each environment. This often leads to problems because the standard benchmarks may bear little relationship to the work you actually want to do, and it often turns out that the “fastest” machine (software) according to the benchmark tests is not the fastest in actual usage. Still, it is often all we have.

CAD/CAM — CAD stands for Computer-Aided Drafting (Drawing) and refers to software designed to let you draw patterns on the computer screen and use the computer to assist in editing your work. CAM is Computer-Aided Manufacturing and indicates actual physical control of some machine(s) by the computer (the computer and controlled machine together are an industrial robot).

Clock Speed — All computers use some sort of a clock to control the activities of the various memory, logic and switching functions that make up computing. Just as an electric clock is controlled by the steady 60-cycle-per-second house current, everything inside a computer is synchronized by its clock chip. In some cases, you can change this clock speed and thereby speed up the computer’s operation. When comparing clock speeds of various computers the numbers aren’t all that helpful; the actual throughput (see throughput) of your work depends on many other factors relating to the efficiency of your software and hardware.

Compatible — This can mean anything from virtually identical in every way to vaguely similar depending on what sort of compatibility you are talking about. For example, an ap-

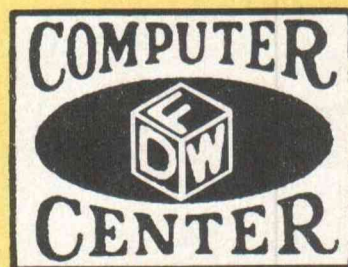
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Compiler/Interpreter — Terms that describe the way a language operates (you must usually buy a language separately to talk to the computer). If you have an interpreter, a program you write is interpreted one line at a time into another language (machine language) and stored until the entire program is translated. The computer then executes the program.

In a compiled language, the program is compiled one time (after all the bugs are corrected) and the resulting machine language is stored. Any time after that you just run the compiled version directly, saving the program you wrote (called the source code). A language is either interpreted or it needs a compiler. BASIC can be either, but the version that comes with most computers is interpreted.

The reason you might want an interpreter is that for short programs it is quite fast enough, and you don't have to wait for a new program to "compile," which can take awhile. An interpreter is by far the best choice if you write many short programs and make lots of changes to them.

Controller — (disk, mouse, etc.) The part that handles the transfer of data between the computer and the device. A disk drive by itself will do nothing until connected to a controller; the same goes for a mouse and other devices.

Disk Drive (bare) — A bare disk drive comes without a case and often without a power supply, so it is not a great bargain unless you know how to put all the parts together.

Copy-protected — The dreaded description of a piece of software that means you can't make a backup copy for use in the event the original program fails to work due to a problem with the disk. There is usually a way to get another copy from the manufacturer, but this is sometimes complicated and takes time. Some programs are semi-protected (my term) in that you can copy a working copy onto a hard disk, but then the original no longer works. This is only a marginal improvement because you need to know you are going

to have trouble with the hard disk in order to copy the program back onto the original disk, thus making it "good" again.

Disk zap — A utility (see utility) that is helpful in recovering the data from a damaged or worn disk. "Down" is when the computer won't work. "Up" means the system is working.

Expansion board — A printed circuit board that fits into slots on the computer. These expansion boards slide into the back of a Tandy 2000, and in some other computers fit into slots internally. For these you must open the case of the computer to install new boards, but this is a simple procedure and normally does not require the computer to be taken to a dealer.

Expansion Memory — Memory that is added to what originally came with the computer, either on the mother board (see mother board) or an expansion board.

Socketed 0-256K(512K) — (referring to an expansion memory board) This means there are empty sockets installed on the expansion board, and you can either install your own chips at a later time or order it with up to the full listed amount already installed.

Execute — 1) Perform or do, as in the program executed (run). 2) What you (or your spouse) sometimes want to do to the person who introduced you to computers.

Floating Point — A number that has a decimal point in it rather than an integer (1, 2, 3, 56, etc.).

Freeware — A concept for marketing software that could be the answer to your prayers. Freeware is easily available and copies can be made for friends, but you are obligated to make a contribution to the author if you find the program useful. Otherwise, you are requested to erase it from your system. Freeware is simply the honor system applied to software sales.

Public domain — Actually *is* free. Software in the public domain has been donated by the author-owner to the public and is free for all to use, but not to sell as their own.

Hard disk — This is like a bunch of floppy disks glued together, or a small record. It is sealed in a container and because it is more rigid, the tolerances it operates under are more accurate, so more information can be stored on it and it can operate at a much faster rate.

Disk cartridge — A kind of hard disk that can be removed, allowing you to use one drive and have many cartridges,

sort of like floppy disks.

Tape cartridge — A special device that is used to back up or make copies of hard disk files. It uses special tapes and is not suitable for using in place of a hard disk for daily use.

Internal/external disk drive — A description of whether the unit is installed in the computer case or is a stand-alone unit that can be moved from one computer to another easily if desired.

Interface — A term meaning "connection." It is used to indicate both the method of connection (parallel/serial, for example) and the actual physical device or connector (plug).

Mean time between failures (MTBF) — A standard way of comparing components and refers to the average length of operating time between breakdowns.

Mean time to repair (MTTR) — The measure of how long something usually takes to repair and, along with MTBF, is an important consideration in purchasing equipment. If you use a computer for fun, these are less important than price, but if you use a computer to help earn a living, reliability becomes very important.

Mother board — The large circuit board in a computer that really makes it work, as opposed to the expansion boards that offer a choice of options as to how you want the computer modified.

Modem/modem board — A modem is the device that translates the computer's signals over telephone lines to another computer that has the same kind of modem to translate the signals back to computer-usable form (see protocol).

A modem board is a modem mounted on a card that is user-installable in one of the slots inside the computer. This board usually fits in a "short" slot that isn't usable for most other expansion boards.

An external modem requires a cable to connect it to the RS-232 serial port on the computer, but can also be used with almost any other computer. If you don't have an RS-232 connector you need to buy an expansion board containing one, but this board may also have a number of other functions (see multifunction board).

Protocol — The method of translating computer signals into telephone-compatible signals. There are several different protocols, and your modem must operate on the same kind as the one at the remote computer.

Baud — 0-300, 1200 and 2400 are the most common Bauds, or speeds, modems normally use to interchange data. The higher the number, the faster the transfer, but higher speeds require better phone connections.

Acoustic/direct connect — An acoustic modem connects directly to a standard telephone handset and, therefore, works with a pay phone or a hotel phone, but it is more susceptible to interference from local noise. A direct connect modem attaches directly to the standard "modular" clip connector found on many phones and is usually more reliable.

Monitor/RGB/composite — A monitor is like a TV except it gives a clearer picture because it doesn't use the radio frequency signals needed to transmit TV. These same RF signals are generated by the computer, often causing interference with a normal TV. The monitor can also have more lines than a TV.

An RGB monitor needs a controller (driver) in the computer that sends a separate signal to each of the three "guns" (red, green and blue) found in all color TVs and monitors. A composite monitor needs a signal that combines all three signals. The two monitors are not compatible and cannot be interchanged.

Multifunction board — An accessory board that goes in the computer's expansion slot and has more than one added function, such as more memory, real-time clock and RAM disk (see RAM disk).

Multiprogramming/multi-user/multiprocessing — These terms mean several functions are being performed simultaneously on the computer. For instance, when using a word processing program you can print out a file while editing another.

Object code compatible — When one computer has a processor that is object code compatible with another computer, most programs that operate on one will run on the other as well.

Superset/subset (of instructions) — A computer (processor chip) uses all the same instructions as the original chip, with some new instructions added. The one with the larger set of instructions is said to have a superset and the other a subset of instructions, in relation to each other. The one with a superset runs all programs that work on the subset, but not vice versa. The instructions referred to are usually at the machine language level.

Party (first, second and third) — The first party is the computer manufacturer (in our case, Tandy), the third party is someone who makes items for use with first party equipment, and you are the party of the second part, the customer of either of the other two parties.

PC/mainframe — A PC is a personal computer. A PC is small and inexpensive enough for a person or small business to use without a special operator. A mainframe computer is larger, more expensive and so complicated that it needs a special operator to run it.

Print spooler — A software (or hardware and software) device that sets aside a portion of main memory to hold output going to the printer, thus permitting the computer to go on to other tasks while the work is being printed. Or, it is an expansion board that contains both the above mentioned software and some actual physical memory chips.

Parallel/serial — Refers to whether the data being sent between devices is sent all eight bits at the same time along a lot of wires (parallel) or one bit at a time along fewer wires (serial). You need an adapter to change from one to the other, so a serial printer won't work directly from a parallel printer port just by changing wires around.

RS-232/Centronics — RS-232 is a fairly standard method of sending serial data; centronics is the name often applied to both a physical connector and a method of sending parallel data.

RAM disk — Software that partitions a portion of main memory and makes

the computer think it is a very fast disk. It is used like any other disk except it doesn't keep anything after power is turned off. A RAM disk is also a software/hardware combination that comes on an expansion board.

Real-time clock — It has nothing to do with the speed of the computer. A real-time clock is a piece of hardware which is almost always on a board with other items, that performs the odious task of setting the computer's time and date when the computer is turned on. It has a small battery that keeps time while the main current is off. If you are getting a multifunction board with this clock it certainly is a useful addition.

Throughput — What comes out of the computer. For example, the number of letters written and printed out in a particular period of time on a word processor is its throughput.

Utility — A program whose purpose is to assist in using the computer. In other words, a utility is intended to make the computer easier to use.

UNIX/Xenix/OS-9 — These are similar operating systems (different from MS-DOS) that allow several users to hook up terminals to a computer and operate more than one program at the same time. Third parties sell add-on expansion cards that contain a different CPU (Central Processing Unit) family, the 68000 family, as opposed to our 8088 or 80286 CPUs. This new chip is well-suited to UNIX, etc., and permits you to greatly expand the capabilities of your computer, making it similar to the Tandy 6000.

Ware (hard, soft, firm and live) — Hardware is something physical like your computer or printer. Software comes on a disk or printed on paper. Firmware is information or a program that is fixed in a computer chip, such as some BASICS, and isn't accessible for the user to change. Liveware is you, the user.

8088 — The chip (manufactured by Intel) that forms the thinking heart of your Tandy 1000 and 1200.

8087 — The Intel co-processor chip specifically designed to do the math processing for the 8088. If your programs can take advantage of it, your math computations take much less time. The 8087 can be added to the 1000 and 1200, but your software must be capable of using it to get any advantage from this approximately \$200 micro-chip.

80186 — The CPU used in the Tandy 2000.

80286 — The CPU chip installed in the Tandy 3000.

4164 — The common part number of memory chips that are used in the 1000 and 1200. The 4164 chip has one bank of 64K memory.

41256 — A one by 256K memory chip used on some computers. It can be installed in recent 1200s to replace the 64K chips, thus upgrading memory.

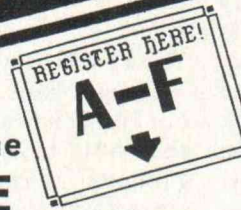
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A primer on DeskMate's Text editor

A Look at Text

By Bobby Ballard

Sometimes it's easy to forget where you've been. This is especially true when you get involved with computers. At first, everything seems complicated or strange. Soon, however, you feel like it's all quite simple and using the computer becomes second nature.

I was reminded of this in a letter from a reader who was having problems with some of the "simple" features of *DeskMate*. Notice I put the word simple in quotes. That's because if you are new to anything it can seem complicated. This month I want to concentrate on a few of the basics found in the Text section of *DeskMate*. Even if you've been using *DeskMate* a long time I think you might find some helpful information, and it's a good chance to refresh your memory on some of the more obscure features found in Text.

Let's face it, the manuals that come with *DeskMate* leave a lot to be desired. If you're used to using a computer, you may have found the manuals adequate. If you look at them from the point of

view of a first-time computer owner, the view looks bleak. There is a lack of information about the machine in general and some of the machine features that can cause problems.

Though the manuals may be insufficient, you should read both and follow the tutorials through to the end, including successfully completing the independent exercises — especially before putting a particular section to serious work. I get letters with questions whose subject matter is completely covered in the manuals. Don't let the title of the second manual, *DeskMate: A Reference Manual*, fool you into not reading it. Sure, it's a reference manual, but it is written for immediate consumption. You might be surprised at what you find there.

The Printer Connection

I might have mentioned this before, but I think it bears repeating. Make sure the cable from your printer to the computer is connected correctly. The correct way on a Tandy 1000 is with the cable exiting the connector from the bottom when connected to the computer. I think this is probably the most often encountered problem for first-time owners.

By the way, the connector to the printer only connects one way. It is impossible to incorrectly connect the

printer end of the cable without using force. I wonder why Tandy didn't use the same idea on both ends?

The Keyboard Influence

Another "problem" that occurs can be blamed on the design of the keyboard. It is not a problem as long as you know about it. The keyboards on most computers are designed to repeat the keystroke if the key is held down longer than a certain delay time, usually around 1.5 seconds, set by the operating system. In addition, the keyboard has a keystroke buffer that holds your keystrokes until the system can process them. If you don't know this, you can be in for some confounding experiences.

The two above features of the keyboard are active while in MS-DOS and in most other application programs. Some software allows you to turn off or adjust the keyboard delay or buffer or both. *DeskMate* does not allow for this and I really think it's not needed as long as you know about the keyboard features and how they affect the behavior of your software.

Both of these features can make your software act as if it just went off the deep end, when, in fact, it's just processing the keys in the buffer. When this happens, pressing a key only compounds the problem instead of solving

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it — especially if you hold the key down, unsuspecting of the keyboard repeat feature.

At other times you may fly past a prompt for important information. Once again, this is caused by the program processing stored keystrokes. You could be inadvertently entering unnecessary keystrokes by pressing, for example, the ENTER key after a response to a prompt that doesn't require you to do so.

You may think this is silly, but I've seen it time and time again: a new user asking why a program whizzes by a certain prompt without a chance to enter a response. The best way to solve this problem is to never type more keystrokes than necessary. When answering prompts, try using just one keystroke without pressing ENTER except when you are entering a filename or other obvious string data.

This might seem obvious or trivial at first, but the point was driven home recently when I sat down at a friend's AT clone and had a devil of time using his CAD program until he told me he had recently "boosted" his cursor speed and repeat delay. After that, I made a quick adjustment to the information and my problems cleared up completely. I realized how easy it is to overlook the simple things after having been at it for a few years. With that premise, I want to tour each of the sections of *DeskMate*, starting with Text, keeping in mind the less obvious and "simple."

The Tour

Let's get started with the tour. We'll start with the first menu selection and move across the screen. The first two selections, Find and Substitute, are closely related. Find locates all occurrences of a particular string, while Substitute finds and replaces one string of text with a new string of text.

The Find function is not "case sensitive." This means it does not care whether the text is upper- or lowercase to find a match. The following strings are equal in a Find operation, Fast, fast, FAST and FaSt. If it were case sensitive, only Fast would match Fast and not fast or any other combination of upper- and lowercase.

When using Substitute, *DeskMate* begins to search for each occurrence of the search string. When it finds a match, *DeskMate* asks if you would like to make the switch or not. Answer with Y to replace with the new text and N to continue searching the next occurrence of the search string.

The next function works like a toggle switch. When in one mode it switches to the other when invoked by the appropriate function key, in this case, F3. This toggling function switches between inserting and overstriking text. It is a pretty straightforward feature but can still be confusing as you will see.

Even to the seasoned computer user, this next example could be confusing. The menu at the bottom of the Text screen has a pair of choices for function key F3 that can be misleading. In one mode, F3 has "Add" below it and, when pressed to enter the other mode, has the selection "Replace" below it. Since it immediately follows the Find and Substitute functions, isn't it logical that Replace is related to finding and substituting? Well, no, not this time.

This time it takes the place of the INSERT key already found on the keyboard. So Add really means Insert, and

"The Merge function is very easy to understand and wouldn't normally give you a pause, except for an error in either the manual or program."

Replace really means Overstrike in traditional word processing terms. I'm sure this is to keep compatibility of *DeskMate* versions among different machines more manageable — especially considering that some machines, even Tandy models, do not have an INSERT key.

The next function, Format, is a misleading title for a single and simple function. This is really the line width setting. If it also allowed you to set margins and other crucial variables, it would be properly named. However, lacking these features it's best to remember this function really only handles line width.

Don't miss this point, though, when it comes to the Format or line width function. It does affect the margins of your text, but you cannot directly set the margins with Format. For example, a line width of 70 leaves margins of five on each side of the document. A line

width of 60 leaves margins of 10 on each side. However, you cannot have a line width of 60 and margins of 15 and five, which still totals 80, because the Format command only supports line width and it automatically centers the text on the line.

The Merge function is very easy to understand and wouldn't normally give you a pause, except for an error in either the manual or program. (I suspect the program is the one in error.) The function works correctly but the prompt for the file to merge does not say Enter merge filename: as stated in the reference manual. Instead, you get a prompt exactly like the one found in the Save feature. It says Enter save filename: when, in fact, it wants the name of the file to merge into your document. Remember to position the cursor where you wish the merged text to begin appearing before selecting this function. Enter a blank filename to abort the Merge operation.

The function found at F6 is for saving your document without exiting the Text section. Use this feature often, particularly when you are working on important data. This allows you to keep a copy of your work on disk, as you compose, without leaving the Text section of *DeskMate*. Also remember that when exiting the Text section using F12, your latest changes are automatically saved unless you use the SHIFT key in combination with F12.

This can be another confusing point for the first-time owner. When using F12 to exit Text, the program automatically saves the document using the same file given as when it was created. That's easy enough. But if you don't wish to save the changes, what do you do? Use SHIFT-F12 and answer the next prompt with a Y. The prompt is confusing because it asks if you want to Cancel Edit (Y/N). An answer of N saves the file with the latest changes included.

The next four features found in the main menu of Text are all related to each other. In this case, Select is especially important to the next three commands. Select does exactly as it says it will, it selects text for performing other operations. When you Select text, it is highlighted to help you easily see the block of text you will be using. One point important to note about Select concerns the rapid cursor movement commands. If you remember that CTRL and the arrow keys along with SHIFT and the arrow keys work in Select just as they do in normal edit mode, you're

covered. If you are unfamiliar with the rapid cursor movement capabilities of *DeskMate*, refer to your manuals for details. You will save yourself hours with this knowledge.

Once you have selected the text, you can do several things with it, one of which is copy it to another disk file or buffer in memory. Copy really works in two different ways, which can be confusing to the first-time user. Come to think of it, it was pretty confusing to me at first.

Remember that Copy can deal with text that has been Selected and Text that is in a file on diskette. If you have previously Selected text, pressing F8 seemingly causes nothing to happen. In reality, the text just selected is copied to an area of the computer's memory to be Inserted (more on this later) elsewhere into your text. This includes moving data across files and across applications — thus the integrated nature of *DeskMate*.

If you have not previously selected any text and you press F8, you are greeted with the prompt From: To: and you can move diskette files in and out of the buffer described above. If you have previously selected text and wish

to call up the alternate Copy function, press F8 again. This calls up the above prompt to allow for diskette file input and output.

When you first see the From: To: prompt, your cursor will be flashing at the From: prompt waiting for a filename. At this point, you may enter a filename and press ENTER or you may press ENTER, thus moving the cursor beside the To: prompt.

Now that you know exactly how the Copy function works, you can achieve some pretty sophisticated file merges using *DeskMate*. This is one of *DeskMate*'s strongest points.

The Delete command also works in two different fashions. If you have previously selected text (F7), the Delete function erases the selected text. If no text has been selected, Delete just erases the character under the cursor. This is exactly the same as the DELETE key on many keyboards.

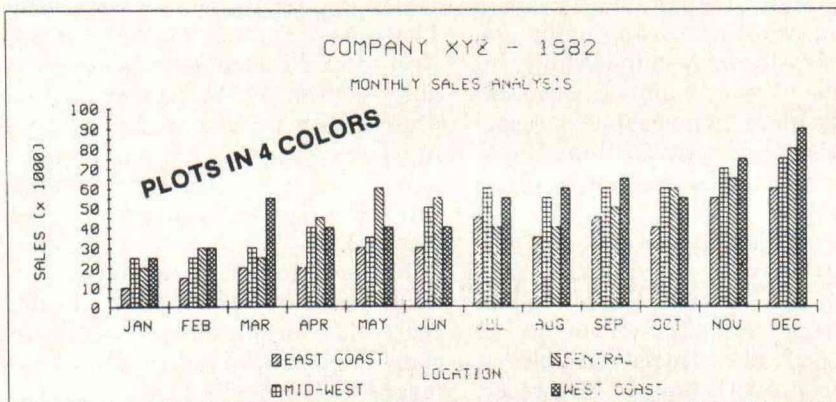
The last function listed is Insert. Insert works somewhat like Merge but involves the contents of the copy buffer regardless of the source of the buffer. If you copy a file from the diskette into the copy buffer and press F10, that file would be inserted into the current

document beginning exactly where the cursor is located. But, with Insert you can also select text in the current document, copy it to the buffer, move the cursor and insert the same text at a different location in the same document. This is a handy feature and it works rather fast, even with large files. The only time I've found Text to slow down is with scrolling long documents; other functions work very fast.

Insert is the last command listed on the screen, but it's not the last function available. Another function not listed is Print. On the Tandy 1000 and 2000 you press the PRINT key to print a document. The Tandy 1200 version uses the PRT SCR key. Check the manual for your version of *DeskMate* and how the Print function works. Just remember to set your printer parameters using the ALT-F6 first.

I will cover the alternate functions of *DeskMate* in next month's issue. If you have any questions or comments on this article, don't hesitate to write or contact me on Delphi in the MS-DOS SIG. You may also write to the address listed. Please enclose a self-addressed, stamped envelope if you would like a reply to your letter. **PCM**

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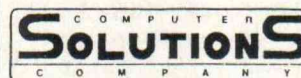


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PC Phone Booth

By Leonard Hyre

Not long ago, I sat down to create a simple phone number listing program for my own use. Then I figured, why not add a mailing list feature? With these two items accomplished, it wasn't long before a graphics

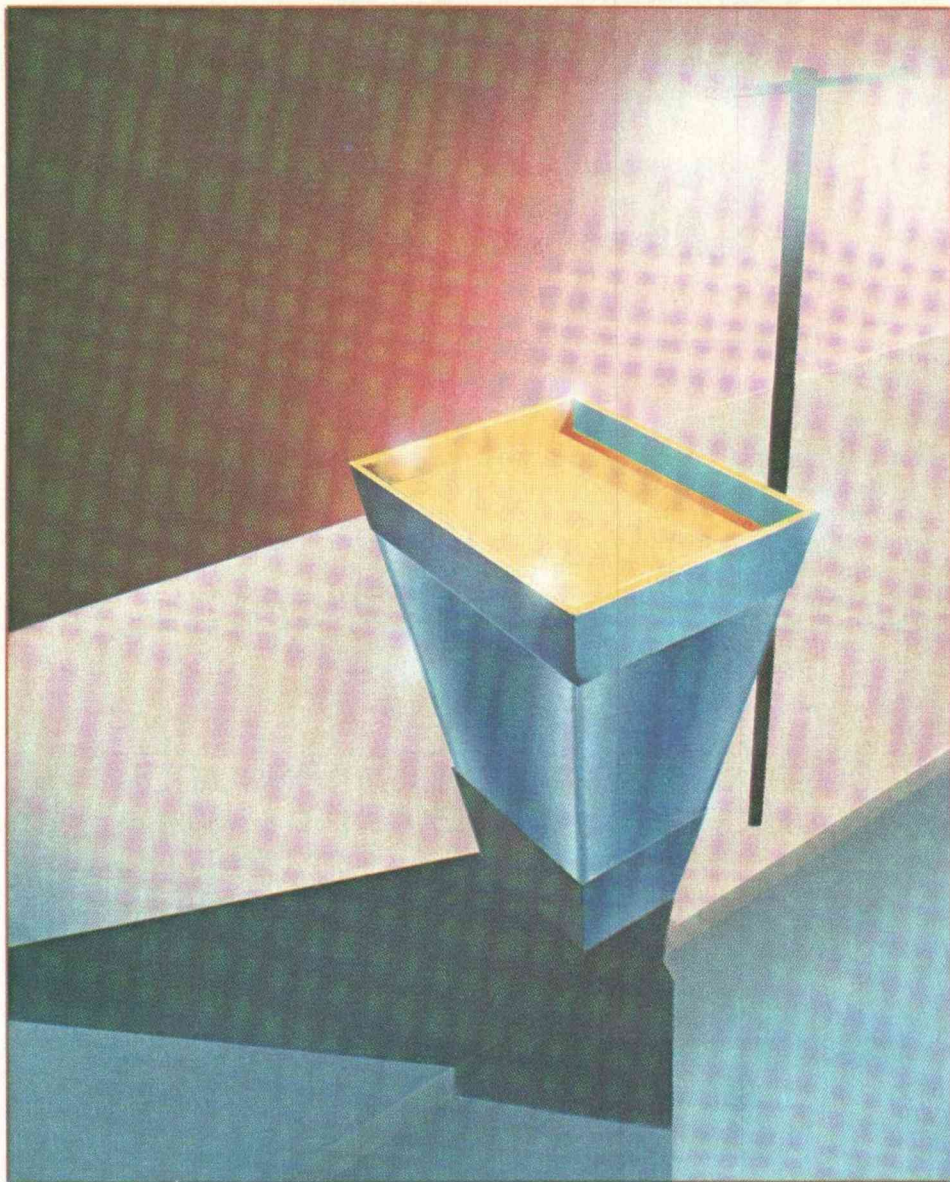
title screen complete with a phone booth and ringing telephone was added.

What's a *PC Phone Booth*, anyway? It's several things bundled together in a single package: a quick reference for phone numbers, a list of customers, Christmas card lists, mailing labels, or whatever kind of "list" you need. You can call up special "sublists" and have them printed out. For example, for a list of all "Widget" buying customers and their phone numbers, just enter *Widget* for the text string and phone list. At Christmas, just enter *Christmas* and choose mail labels. Every person on the list with "Christmas" in the remarks is printed out on a ready-to-go mailing label. Additionally, it is a learning experience for would-be programmers, with lessons in direct file access, graphics and general string manipulation.

PC Phone Booth utilizes a simple highlighted command line to move between functions. The commands include Add Record, Edit Record, List Records, Print-Copy Records, Create a File and Kill a File. The space bar is used to move the highlighted choice bar from one selection to another. Pressing the ENTER key chooses the highlighted selection for further action. You can put everyone into one file or create separate specialty files.

PC Phone Booth's handiest feature is the ability to search for records using any string of text you choose (e.g., Christmas, 21613, Hyre, Big Spender, etc). For the sake of reference, should

Leonard Hyre works as a claims representative for the Social Security Administration. He has written several articles for THE RAINBOW, PCM's sister publication for the Color Computer, and is the author of a number of commercial programs. He may be contacted at P.O. Box 403, Cambridge, MD 21613; (301) 228-0064.



you move files from one disk to another, all *PC Phone Booth* data files automatically use the extension .FDN.

The only part of the program that may need configuring is the mailing list printout, which may require a different tab offset or number of line feeds following a label printout. This is because of the many sizes and shapes of labels and the different printer setups.

Direct Access Files are much like well-organized filing drawers, with each record having its own place for storage and the whole drawer having a handy reference system for finding particular pieces of information. If you follow through the listing, thinking of each portion of the program as a separate tool to perform one task needed by the program, you will be surprised at how it actually does make sense.

Three sections of the program are devoted to actually working on the file records themselves. These are Create, Add and Edit. All of them follow this simple rule: If you open a file, don't forget to close it! This is a cardinal rule for file creation and manipulation.

In the Create a File subroutine (lines 270-530), you can see that once a file is open, you cannot get out of the subroutine without encountering close. You are asked to provide a filename, which must be eight or less characters. No extension is allowed since the program automatically assigns the .FDN extension.

The file structure is defined by Line 370, which tells the computer that each record in the file needs 30 "spaces" allocated as A\$, 26 as B\$, etc. Since all of our data is entered as string data to begin with, no conversion from numeric to string commands is required.

Once a new file has been created, you can continue entering information into it as long as you like. Once it is closed the first time, the Add selection is used to enter additional records. The Edit function works in a similar manner, allowing you to rewrite any one or more of the individual strings in a record, then rewrite that entire record accordingly.

Kill a File is the way to get rid of an unwanted file. This routine is found at lines 1400-1500 and is not at all complicated. The only thing to be careful about here is that you must be sure of your choice and the consequences of the same. As a safety measure, the program double-checks before performing the task of eliminating a file.

The List and Print selections share many common features since both

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require that the program locate and provide the user with specific files as required. Using the List section as an example, the user is prompted to select files by "browse" (look at all records starting at '1'), by specific number (select number of file record to look at) or to select by specific "text."

The third method gives *PC Phone Booth* the versatility to be useful and friendly to the user. Suppose you did want a list of all Widget buyers. By selecting search by text, the program goes through each record searching for an occurrence of Widget. Of course, if one of the people in the file is named George Widget, his name will come up also, so be specific. Just as easily, you can list out people with a particular ZIP code, phone number exchange, etc.

Make good use of the remarks section of each record so the program works better for you. Would-be programmers might like to take a look at the use of the INSTR command in lines 1170-1240. When you elect to print out records for phone lists, mailing labels or whatever, similar routines to those for screen lists are used.

In addition to the selection of specific records, options are given for four types of listings, including complete record with remarks, name, address and phone number, the name and phone number only, or a mailing label printout. Since names are normally entered last name first for records, the program must reverse them for mailing labels. The small routine in lines 2820-2880 performs this task.

The fun part of writing the program was drawing the phone booth and making the phone ring properly. My family was beginning to lose patience at my constantly dragging them in to hear what the latest "phone ring" sounded like. When I had it sounding just right on the 1000, I thought I had it made. Then a computing friend loaded it into his 3000 and the ring sounded different. We finally came up with a ring that sounds "just about" right on either.

PC Phone Booth should run fine on any configuration of the 1000. It also works on the 3000, which indicates across the board MS-DOS compatibility among all the Tandy MS-DOS series and compatibles (like IBM). Since the 2000 supports these same screens, no real problems should crop up there, either.

If you have difficulty in getting the program to work correctly, feel free to contact me by mail or phone. My address is P.O. Box 403, Cambridge, MD

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21613; the phone number is (301) 228-0064 (from 5 - 11:00 p.m. EST). *PC Phone Booth* is available on PCM ON DISK or through the MS-DOS SIG on Delphi. Should you have a question or comment concerning the program, you can leave a message to MUNCH on the MS-DOS SIG any weekend. ☐

The listing:

```

10 *****
20 '*
30 '* PHONE BOOTH by L. Hyre *
40 '* (C) 1986 *
50 '*
60 *****
70 '
80 'FOR TANDY MS-DOS COMPUTERS [ Written On T1000...May Be Slight Differences
    for T1200, T2000,T3000 ]
90 '
100 '*** GO DRAW PHONE BOOTH AND RING THE PHONE ***
110 '
120 'GOSUB 3110
130 '
140 '*** SET UP MAIN DISPLAY AREA INCLUDING MENU ***
150 '
160 KEY OFF:WIDTH 80:SCREEN 0,1:COLOR 2,0:CLS
170 KEY(1) ON:ON KEY(1) GOSUB 3300
180 TP$=CHR$(201)+STRING$(78,205)+CHR$(187):BT$=CHR$(200)+STRING$(78,205)+CHR$(1
88):SD$=CHR$(186)+SPACE$(78)+CHR$(186)
190 PRINT TP$;SD$;BT$:COLOR 12:LOCATE 2,200:PRINT"The P H O N E - B O O T H ...
    ....by L. Hyre
200 PRINT:COLOR 14:PRINT TP$;SD$;BT$
210 LOCATE 5,3:COLOR 3:PRINT "Add Edit List (Selective) Print Copy Crea
te (New) Kill (Existing) " :COLOR 15,4:LOCATE 5,3:PRINT"Add":COLOR 7,0
220 PRINT:PRINT TP$;:FOR TM=1 TO 14:PRINT SD$;:NEXT:PRINT BT$:COLOR 4:LOCATE 24,
1:PRINT STRING$(80,220);:LOCATE 25,62:COLOR 4,15:PRINT"[ F1=QUIT ]";
230 GOTO 2920
240 '
250 '*** CREATE A 'NEW' PHONE FILE
260 '
270 RC%=1:LOCATE 23,1:COLOR ,0:PRINT SPACE$(80):LOCATE 23,1:COLOR 14:PRINT"CREAT
E - This Function CREATES New File.":COLOR 4:PRINT" AVOID Duplicate File Name
s !!!"
280 '
290 COLOR 15,0:LOCATE 8,4:PRINT "Name of FILE to create [No Ext]";:INPUT FI$
300 FOR EX=1 TO LEN(FI$):IF MID$(FI$,EX,1)=". " THEN FI$=LEFT$(FI$,EX-1):GOTO 310
:ELSE NEXT EX
310 IF LEN(FI$) >8 THEN FI$=LEFT$(FI$,8)
320 FI$=FI$+".fon":LOCATE 8,4:PRINT SPACE$(50):LOCATE 8,4:COLOR 3:PRINT"Creating
File called ";FI$
330 OPEN "R",1,FI$,128
340 '
350 ' *** DEFINE THE LENGTH OF EACH FIELD ***
360 '
370 FIELD 1,30 AS A$,26 AS B$,28 AS C$,12 AS D$,32 AS E$
380 LOCATE 9,4:PRINT "Next Record #":RC%
390 IF RC%>1 THEN LOCATE 21,4:COLOR 14:INPUT"Another [ Y/N ]":AN$:IF AN$="Y" OR
AN$="y" THEN 400 ELSE 520
400 LOCATE 10,4:PRINT"Enter NAME (Last Name First)...":LOCATE 11,9:INPUT NM$
410 LOCATE 12,4:PRINT"Enter Street or PO Box Address...":LOCATE 13,9:INPUT ST$
420 LOCATE 14,4:PRINT"Enter CITY - STATE - & ZIP CODE":LOCATE 15,9:INPUT CT$
430 LOCATE 16,9:PRINT"Enter PHONE Number:":LOCATE 17,9:INPUT PN$
440 LOCATE 18,4:PRINT"Enter REMARKS (32 Space Maximum)":LOCATE 19,9:INPUT RM$
450 LSET A$=NM$:LSET B$=ST$:LSET C$=CT$:LSET D$=PN$:LSET E$=RM$
460 PUT #1,RC%
470 FOR WIPE=9 TO 19:LOCATE WIPE,4:PRINT STRING$(40," "):NEXT WIPE
480 RC%=RC%+1:GOTO 380

```



```

490 '
500 '*** ALWAYS CLOSE THE FILE ! ***
510 '
520 CLOSE 1
530 GOSUB 3370:LOCATE 5,49:COLOR 3:PRINT M$(5):LOCATE 5,3:COLOR 15,4:PRINT M$(1)
:GOTO 2920
540 '
550 '
560 '*** LIST a File ***
570 '
580 LOCATE 23,1:COLOR ,0:PRINT SPACE$(80):LOCATE 23,1:COLOR 2,0:PRINT"Selective
List of Phone Booth entries..."
590 LOCATE 8,4:COLOR 3:INPUT"NAME of File To Use [No .ext] ";FI$:IF FI$=""THEN 8
30
600 FOR EX=1 TO LEN(FI$):IF MID$(FI$,EX,1)=". " THEN COLOR 4:LOCATE 9,4:PRINT"ILL
EGAL Filename!":SOUND 300,2:FOR P=1 TO 2000:NEXT:LOCATE 8,4:PRINT SPACE$(50):LOC
ATE 9,4:PRINT SPACE$(50):GOTO 590:ELSE NEXT EX
610 IF LEN(FI$)>8 THEN FI$=LEFT$(FI$,8)
620 FI$=FI$+".FON"
630 OPEN "R",1,FI$,128
640 FIELD 1,30 AS A$,26 AS B$,28 AS C$,12 AS D$,32 AS E$
650 SIZE=128
660 LOCATE 21,55:COLOR 14:PRINT"Number of Records:";(LOF(1)/SIZE):IF (LOF(1)/SIZ
E)=0 THEN LOCATE 10,4:COLOR 4:PRINT"No RECORDS in File by that Name!":FOR P=1 TO
2000:NEXT:LOCATE 10,4:PRINT SPACE$(50):LOCATE 8,4:PRINT SPACE$(50):CLOSE 1:GOTO
590
670 RC%=1
680 GOTO 890
690 FOR MAX=1 TO (LOF(1)/SIZE)
700 IF RC%=0 OR RC% > (LOF(1)/SIZE) THEN 820
710 GET #1,RC%
720 LOCATE 9,4:PRINT "Record Number: ";RC%
730 IF VAL(CH$)<1 THEN 790
740 LOCATE 10,4:PRINT"Name : "A$
750 LOCATE 11,4:PRINT"Street: "B$
760 LOCATE 12,4:PRINT"Cty/St: "C$
770 LOCATE 13,4:PRINT"Phone : "D$
780 LOCATE 14,4:PRINT"Remark: "E$
790 AK$=INKEY$:IF AK$=""THEN 790
800 FOR WIPE=10 TO 15:LOCATE WIPE,4:PRINT STRING$(40," "):NEXT
810 RC%=RC%+1:NEXT MAX
820 CLOSE 1
830 GOSUB 3370:LOCATE 21,55:PRINT SPACE$(23):LOCATE 23,1:PRINT SPACE$(80)
840 LOCATE 5,16:COLOR 3,0:PRINT M$(3):LOCATE 5,3:COLOR 15,4:PRINT M$(1):GOTO 292
0
850 '
860 '
870 '*** MENU FOR SELECTIVE LISTING ***
880 '
890 LOCATE 9,4:COLOR 2:PRINT"Select TYPE of LISTING you desire-":COLOR 15
900 LOCATE 10,10:PRINT"1> Browse Through File"
910 LOCATE 11,10:PRINT"2> Specific Record by NUMBER"
920 LOCATE 12,10:PRINT"3> Search by 'TEXT' Occurrence"
930 LOCATE 14,4:COLOR 2:PRINT"Press NUMBER of Choice":LOCATE 13,10:PRINT"_____
"
940 CH$=INKEY$:IF CH$=""THEN 940
950 IF VAL(CH$)<1 OR VAL(CH$)>3 THEN SOUND 300,2:GOTO 940
960 FOR WIPE=9 TO 14:LOCATE WIPE,4:PRINT SPACE$(50):NEXT
970 ON VAL(CH$) GOTO 690,1010,1160
980 '
990 '*** SEARCH BY NUMBER ***
1000 '
1010 LOCATE 21,4:COLOR 13:PRINT"Enter 0 To EXIT To Menu":LOCATE 10,4:COLOR 15,1:
INPUT"RECORD NUMBER TO VIEW";RC%
1020 IF RC%=0 THEN CLOSE 1:COLOR ,0:LOCATE 21,4:PRINT SPACE$(40):GOTO 830
1030 IF RC%> (LOF(1)/SIZE) THEN LOCATE 11,4:COLOR 4,15:PRINT"No Such Record #":F
OR P=1 TO 2000:NEXT:COLOR ,0:LOCATE 11,4:PRINT SPACE$(50):LOCATE 10,4:PRINT SPAC
E$(50):GOTO 1010
1040 GET #1,RC%
1050 COLOR 2,0:LOCATE 12,4:PRINT"Name : "A$
1060 LOCATE 13,4:PRINT"Street: "B$
1070 LOCATE 14,4:PRINT"Cty/St: "C$
1080 LOCATE 15,4:PRINT"Phone : "D$
1090 LOCATE 16,4:PRINT"Remark: "E$

```



```

1100 LOCATE 18,4:COLOR 14:PRINT"Press ANY KEY for another Selection.."
1110 AK$=INKEY$:IF AK$=""THEN 1110
1120 LOCATE 10,4:PRINT SPACES(24):FOR WIPE=12 TO 18:LOCATE WIPE,4:PRINT SPACES(5
0):NEXT WIPE:GOTO 1010
1130 '
1140 '*** STRING SEARCH ***
1150 '
1160 LOCATE 20,4:PRINT"Hit '0' To EXIT to Menu":LOCATE 21,4:COLOR 13:PRINT "Any
Other Key To Continue":LOCATE 10,4:COLOR 15,0:INPUT"Enter the Exact TEXT to matc
h":ST$
1170 FOR MAX=1 TO (LOF(1)/SIZE)
1180 GET #1,RC%
1190 IF INSTR(A$,ST$) THEN 1250
1200 IF INSTR(B$,ST$) THEN 1250
1210 IF INSTR(C$,ST$) THEN 1250
1220 IF INSTR(D$,ST$) THEN 1250
1230 IF INSTR(E$,ST$) THEN 1250
1240 GOTO 1330
1250 LOCATE 9,4:PRINT"Record Number: ";RC%
1260 LOCATE 10,4:PRINT"Name : "A$
1270 LOCATE 11,4:PRINT"Street: "B$
1280 LOCATE 12,4:PRINT"Cty/St: "C$
1290 LOCATE 13,4:PRINT"Phone : "D$
1300 LOCATE 14,4:PRINT"Remark: "E$
1310 AK$=INKEY$:IF AK$=""THEN 1300
1320 IF AK$="0" THEN 1350
1330 IF RC%=(LOF(1)/SIZE) THEN COLOR 15,4:LOCATE 16,4:PRINT"End of FILE Encounte
red":SOUND 300,2:FOR P=1 TO 1000:NEXT P:GOTO 1350
1340 RC%=RC%+1:NEXT MAX
1350 LOCATE 5,3:COLOR 15,4:PRINT M$(1):LOCATE 5,16:COLOR 3,0:PRINT M$(3):GOSUB 3
370
1360 CLOSE 1:GOTO 2900
1370 '
1380 '*** KILL [Utterly Destroy] A File ***
1390 '
1400 LOCATE 23,1:COLOR ,0:PRINT SPACES(80):LOCATE 23,1:COLOR 13,0:PRINT"KILL - F
ile Will Be Destroyed! Be CAREFUL!"
1410 LOCATE 9,4:COLOR 3,0:PRINT"Enter NAME of FILE to be KILLED.....":LOCATE 10,
4:INPUT KL$
1420 FOR EX=1 TO LEN(KL$):IF MID$(KL$,EX,1)=". "THEN 1430:ELSE NEXT EX:GOTO 1440
1430 LOCATE 10,4:COLOR 4:PRINT"Illegal FILE NAME.....Do Not Enter the .EXT":BEEP
:FOR P=1 TO 2000:NEXT:LOCATE 10,4:PRINT SPACES(50):COLOR 3:GOTO 1410
1440 KL$=KL$+".FON":LOCATE 12,4:PRINT"Preparing to DESTROY FILE called ";KL$
1450 ON ERROR GOTO 1500
1460 LOCATE 14,4:PRINT"Hit the Y key to KILL....any other key to CANCEL."
1470 CH$=INKEY$:IF CH$=""THEN 1470
1480 IF CH$="Y" OR CH$="y" THEN KILL KL$:FOR P=1 TO 1000:NEXT
1490 LOCATE 5,64:COLOR 3,0:PRINT M$(6):FOR WIPE=9 TO 16:LOCATE WIPE,4:PRINT SPAC
E$(60):NEXT:LOCATE 5,3:COLOR 15,4:PRINT M$(1):GOTO 2920
1500 LOCATE 16,4:COLOR 15:PRINT"Sorry- NO SUCH FILE Existed!":FOR P=1 TO 2000:NE
XT:GOTO 1490
1510 '
1520 '*** ADD an Entry ***
1530 '
1540 LOCATE 23,1:COLOR 15,1:PRINT SPACES(80):LOCATE 23,1:PRINT"ADD to Existing F
iles":COLOR ,0
1550 LOCATE 8,4:COLOR 2:INPUT "Enter Name Of FILE To Use";FI$:IF FI$=""THEN 1550
1560 FOR EX=1 TO LEN(FI$):IF MID$(FI$,EX,1)=". " THEN COLOR 4:LOCATE 9,4:PRINT"I
llegal FILE Name!":SOUND 300,2:FOR P=1 TO 2000:NEXT:LOCATE 8,4:PRINT SPACES(50):
LOCATE 9,4:PRINT SPACES(50):GOTO 1550:ELSE NEXT EX
1570 FI$=FI$+".FON"
1580 OPEN "R",1,FI$,128
1590 FIELD 1,30 AS A$,26 AS B$,28 AS C$,12 AS D$,32 AS E$
1600 SIZE=128
1610 LOCATE 21,55:COLOR 14:PRINT"Number of Records:";(LOF(1)/SIZE):IF (LOF(1)/SI
ZE)=0 THEN LOCATE 10,4:COLOR 4:PRINT"No RECORDS in File by that Name!":FOR P=1 T
O 2000:NEXT:LOCATE 10,4:PRINT SPACES(50):LOCATE 8,4:PRINT SPACES(50):CLOSE 1:GOT
O 1550
1620 RC%=(LOF(1)/SIZE)+1
1630 LOCATE 9,4:PRINT"Adding Record #";RC%
1640 LOCATE 10,4:PRINT"Enter NAME (Last Name First)...":LOCATE 11,9:INPUT NM$
1650 LOCATE 12,4:PRINT"Enter Street or PO Box Address...":LOCATE 13,9:INPUT ST$
1660 LOCATE 14,4:PRINT"Enter CITY - STATE - & ZIP CODE":LOCATE 15,9:INPUT CT$
1670 LOCATE 16,9:PRINT"Enter PHONE Number:":LOCATE 17,9:INPUT PN$

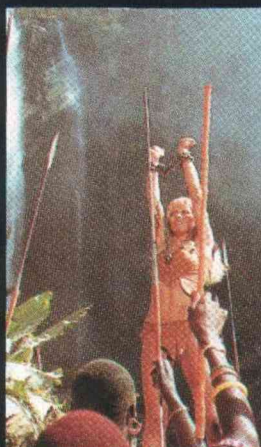
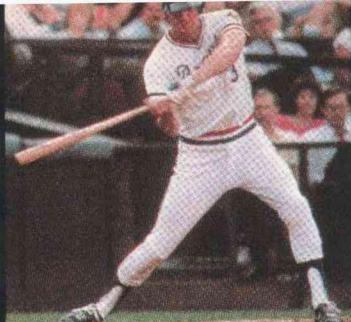
```



```

1680 LOCATE 18,4:PRINT"Enter REMARKS (32 Space Maximum):":LOCATE 19,9:INPUT RM$
1690 LSET A$=NM$:LSET B$=ST$:LSET C$=CT$:LSET D$=PN$:LSET E$=RM$
1700 PUT #1,RC%
1710 GOSUB 3370
1720 LOCATE 21,4:COLOR 15:PRINT"Add Another Record [ Y/N ]"
1730 AK$=INKEY$:IF AK$=""THEN 1730
1740 IF AK$="Y" OR AK$="y" THEN 1750 ELSE 1770
1750 LOCATE 21,4:PRINT SPACE$(40)
1760 GOTO 1620
1770 CLOSE 1:GOSUB 3370:GOTO 2900
1780 '
1790 '*** EDIT Existing File ***
1800 '
1810 LOCATE 23,1:COLOR 15,1:PRINT SPACE$(80):LOCATE 23,1:PRINT"EDIT an Existing
File":COLOR ,0
1820 LOCATE 8,4:COLOR 2:INPUT"Enter Name of FILE to use ":FI$:IF FI$=""THEN 1770
1830 FOR EX=1 TO LEN(FI$):IF MID$(FI$,EX,1)=". " THEN COLOR 4:LOCATE 9,4:PRINT"IL
LEGAL Filename!":SOUND 300,2:FOR P=1 TO 2000:NEXT:LOCATE 8,4:PRINT SPACE$(50):LO
CATE 9,4:PRINT SPACE$(50):GOTO 1550:ELSE NEXT EX
1840 FI$=FI$+".FON"
1850 OPEN "R",1,FI$,128
1860 FIELD 1,30 AS A$,26 AS B$,28 AS C$,12 AS D$,32 AS E$
1870 SIZE=128
1880 LOCATE 21,55:COLOR 14:PRINT"Number of Records:":(LOF(1)/SIZE):IF (LOF(1)/SI
ZE)=0 THEN LOCATE 10,4:COLOR 4:PRINT"No RECORDS in File by that Name!":FOR P=1 T
O 2000:NEXT:LOCATE 10,4:PRINT SPACE$(50):LOCATE 8,4:PRINT SPACE$(50):CLOSE 1:GOT
O 1820
1890 LOCATE 9,4:COLOR 2:INPUT"Enter Record Number to EDIT":RC%
1900 IF RC% =0 THEN 2060
1910 IF RC% > (LOF(1)/SIZE) THEN LOCATE 11,4:COLOR 4,15:PRINT"No Such Record #":
FOR P=1 TO 2000:NEXT:COLOR ,0:LOCATE 11,4:PRINT SPACE$(50):LOCATE 10,4:PRINT SPA
CE$(50):GOTO 1890
1920 GET #1,RC%
1930 LOCATE 10,4:PRINT"Change This:":COLOR 15:PRINT A$;:COLOR 2:INPUT" Y/N";CG
$:IF CG$="Y" OR CG$="y" THEN LOCATE 11,4:PRINT"Input New":COLOR 15:INPUT NM$:C
OLOR 2:ELSE A$=NM$
1940 FOR WIPE=10 TO 11:LOCATE WIPE,4:PRINT SPACE$(60):NEXT
1950 LOCATE 10,4:PRINT"Change This:":COLOR 15:PRINT B$;:COLOR 2:INPUT" Y/N";CG
$:IF CG$="Y" OR CG$="y" THEN LOCATE 11,4:PRINT"Input New":COLOR 15:INPUT ST$:C
OLOR 2:ELSE B$=ST$
1960 FOR WIPE=10 TO 11:LOCATE WIPE,4:PRINT SPACE$(60):NEXT
1970 LOCATE 10,4:PRINT"Change This:":COLOR 15:PRINT C$;:COLOR 2:INPUT" Y/N";CG
$:IF CG$="Y" OR CG$="y" THEN LOCATE 11,4:PRINT"Input New":COLOR 15:INPUT CT$:C
OLOR 2:ELSE C$=CT$
1980 FOR WIPE=10 TO 11:LOCATE WIPE,4:PRINT SPACE$(60):NEXT
1990 LOCATE 10,4:PRINT"Change This:":COLOR 15:PRINT D$;:COLOR 2:INPUT" Y/N";CG
$:IF CG$="Y" OR CG$="y" THEN LOCATE 11,4:PRINT"Input New":COLOR 15:INPUT PN$:C
OLOR 2:ELSE D$=PN$
2000 FOR WIPE=10 TO 11:LOCATE WIPE,4:PRINT SPACE$(60):NEXT
2010 LOCATE 10,4:PRINT"Change This:":COLOR 15:PRINT E$;:COLOR 2:INPUT" Y/N";CG
$:IF CG$="Y" OR CG$="y" THEN LOCATE 11,4:PRINT"Input New":COLOR 15:INPUT RM$:C
OLOR 2:ELSE E$=RM$
2020 FOR WIPE=10 TO 11:LOCATE WIPE,4:PRINT SPACE$(60):NEXT
2030 LSET A$=NM$:LSET B$=ST$:LSET C$=CT$:LSET D$=PN$:LSET E$=RM$
2040 PUT #1,RC%
2050 FOR WIPE=9 TO 11:LOCATE WIPE,4:PRINT SPACE$(60):NEXT:GOTO 1890
2060 FOR WIPE=8 TO 21:LOCATE WIPE,4:PRINT SPACE$(74):NEXT:CLOSE 1:GOTO 2900
2070 '
2080 '*** PRINTER OPERATIONS ***
2090 '
2100 LOCATE 8,4:COLOR 14:INPUT"Input NAME Of FILE To Use":FI$:IF FI$=""THEN 2100
2110 FOR EX=1 TO LEN(FI$):IF MID$(FI$,EX,1)=". " THEN COLOR 4:LOCATE 9,4:PRINT"IL
LEGAL Filename!":SOUND 300,2:FOR P=1 TO 2000:NEXT:LOCATE 8,4:PRINT SPACE$(50):LO
CATE 9,4:PRINT SPACE$(50):GOTO 2100:ELSE NEXT EX
2120 IF LEN(FI$)>8 THEN FI$=LEFT$(FI$,8)
2130 FI$=FI$+".FON"
2140 OPEN "R",1,FI$,128
2150 FIELD 1,30 AS A$,26 AS B$,28 AS C$,12 AS D$,32 AS E$
2160 SIZE=128
2170 LOCATE 9,4:COLOR 3,0:PRINT"Select TYPE of Printer List You Want:"
2180 LOCATE 10,4:COLOR 15:PRINT"1> Complete Record (include remarks)"
2190 LOCATE 11,4:PRINT"2> Name, Address and Phone Number"
2200 LOCATE 12,4:PRINT"3> Phone Listing (Name and Phone #)"
2210 LOCATE 13,4:PRINT"4> Mailing Labels"

```

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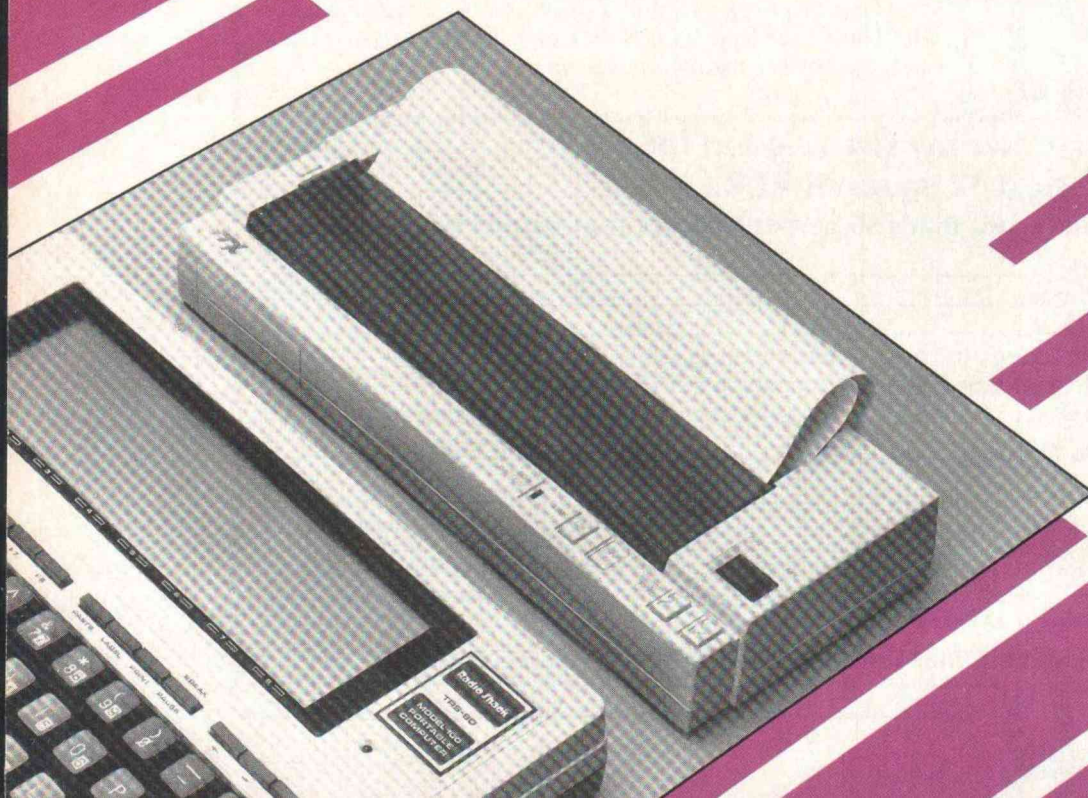
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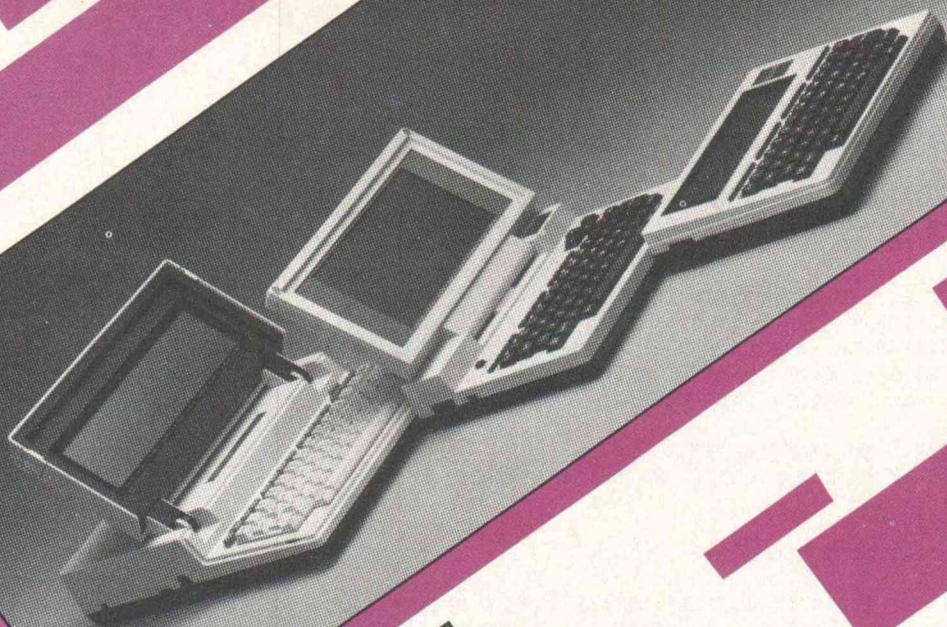
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```

2220 LOCATE 16,4:COLOR 2:PRINT"Press Number Of Choice":LOCATE 17,4:PRINT"_____
"
2230 TY$=INKEY$:IF TY$=""THEN 2230
2240 IF VAL(TY$)> 4 THEN 2230
2250 GOSUB 3370
2260 LOCATE 9,4:COLOR 3:PRINT"Select Specifics Of Printer List:"
2270 LOCATE 10,4:COLOR 15:PRINT"1> All Records"
2280 LOCATE 11,4:PRINT"2> Specific Record Numbers"
2290 LOCATE 12,4:PRINT"3> Search By 'TEXT' Occurrence"
2300 LOCATE 14,4:COLOR 2:PRINT"Press Number Of Choice":LOCATE 15,4:PRINT"_____
"
2310 NC$=INKEY$:IF NC$=""THEN 2310
2320 IF VAL(NC$)> 3 THEN 2320
2330 FOR WIPE=8 TO 15:LOCATE WIPE,4:PRINT SPACES(70):NEXT
2340 LOCATE 10,4:COLOR ,0:PRINT SPACES(70)
2350 IF VAL(NC$)=2 THEN 2480 ELSE IF VAL(NC$)=3 THEN 2590
2360 RC%=1
2370 FOR MAX=1 TO (LOF(1)/SIZE)
2380 IF RC% =0 OR RC% > (LOF(1)/SIZE) THEN 2420
2390 GET #1,RC%
2400 GOSUB 2760
2410 RC%=RC%+1:NEXT MAX
2420 CLOSE 1
2430 COLOR 3,0:FOR WIPE=8 TO 14:LOCATE WIPE,4:PRINT SPACES(70):NEXT
2440 LOCATE 5,35:PRINT M$(4):LOCATE 5,3:COLOR 15,4:PRINT M$(1):GOTO 2900
2450 '
2460 '*** PRINT OUT SPECIFIC RECORD NUMBERS
2470 '
2480 LOCATE 21,4:COLOR 13:PRINT"Enter 0 To EXIT To Menu":LOCATE 10,4:COLOR 15,1:
INPUT"RECORD NUMBER TO PRINT";RC%
2490 IF RC%=0 THEN CLOSE 1:COLOR 3,0:LOCATE 10,4:PRINT SPACES(50):LOCATE 21,4:PR
INT SPACES(40):GOTO 2440
2500 IF RC%> (LOF(1)/SIZE) THEN LOCATE 11,4:COLOR 4,15:PRINT"No Such Record #":F
OR P=1 TO 2000:NEXT:COLOR ,0:LOCATE 11,4:PRINT SPACES(50):LOCATE 10,4:PRINT SPAC
ES(50):GOTO 2480
2510 GET #1,RC%
2520 GOSUB 2760
2530 LOCATE 18,4:COLOR 14:PRINT"Press ANY KEY for another Selection.."
2540 AK$=INKEY$:IF AK$=""THEN 2540
2550 COLOR ,0:LOCATE 10,4:PRINT SPACES(50):FOR WIPE=12 TO 18:LOCATE WIPE,4:PRINT
SPACES(50):NEXT WIPE:GOTO 2480
2560 '
2570 '*** PRINT OUT BY TEXT STRING ***
2580 '
2590 RC%=1:LOCATE 21,4:COLOR 13:PRINT "Enter 0 to EXIT To Menu":LOCATE 10,4:COLO
R 15,0:INPUT"Enter the Exact TEXT to match";ST$
2600 FOR MAX=1 TO (LOF(1)/SIZE)
2610 GET #1,RC%
2620 IF INSTR(A$,ST$) THEN 2680
2630 IF INSTR(B$,ST$) THEN 2680
2640 IF INSTR(C$,ST$) THEN 2680
2650 IF INSTR(D$,ST$) THEN 2680
2660 IF INSTR(E$,ST$) THEN 2680
2670 GOTO 2690
2680 GOSUB 2760
2690 IF RC%=(LOF(1)/SIZE) THEN COLOR 15,4:LOCATE 16,4:PRINT"End of FILE Encounte
red":SOUND 300,2:FOR P=1 TO 1000:NEXT P:GOTO 2710
2700 RC%=RC%+1:NEXT MAX
2710 LOCATE 5,3:COLOR 15,4:PRINT M$(1):LOCATE 5,35:COLOR 3,0:PRINT M$(4):GOSUB 3
370
2720 CLOSE 1:GOTO 2900
2730 '
2740 '*** PRINTER ROUTINES ***
2750 '
2760 IF VAL(TY$)=1 THEN LPRINT A$:LPRINT B$:LPRINT C$:LPRINT D$:LPRINT E$:LPRINT
:LPRINT
2770 IF VAL(TY$)=2 THEN LPRINT A$:LPRINT B$:LPRINT C$:LPRINT D$:LPRINT:LPRINT
2780 IF VAL(TY$)=3 THEN LPRINT A$:LPRINT D$:LPRINT:LPRINT
2790 IF VAL(TY$)=4 THEN GOSUB 2820
2800 IF VAL(TY$)=4 THEN LPRINT TAB(4);FIRST$:SECOND$:LPRINT TAB(4);B$:LPRINT TAB
(4);C$:FOR SKIP=1 TO 4:LPRINT:NEXT SKIP
2810 RETURN
2820 FOR SW=1 TO LEN(A$):IF MID$(A$,SW,1)=" " THEN 2830 ELSE NEXT SW:RETURN
2830 FIRST$=RIGHT$(A$,LEN(A$)-SW):SECOND$=LEFT$(A$,SW-1)

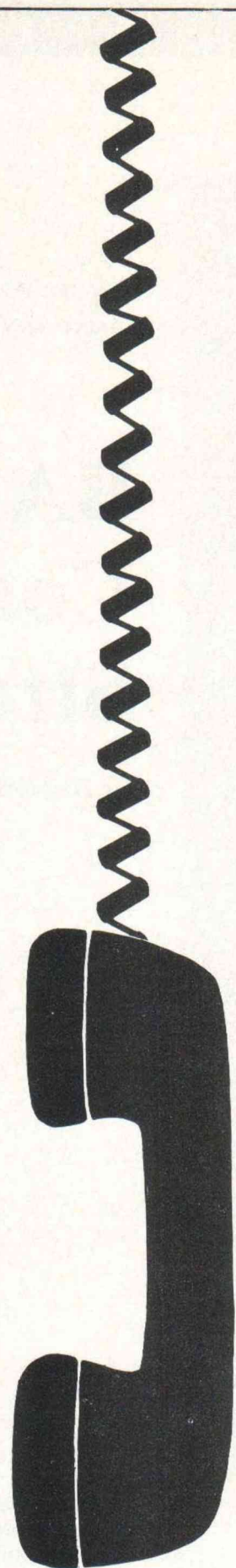
```



```

2840 FOR X=1 TO LEN(FIRST$):IF MID$(FIRST$,X,1)=" " THEN 2850 ELSE NEXT X
2850 FIRST$=LEFT$(FIRST$,X)
2860 FOR X=1 TO LEN(SECOND$):IF MID$(SECOND$,X,1)=" " THEN 2870 ELSE NEXT X
2870 SECOND$=LEFT$(SECOND$,X)
2880 RETURN
2890 '
2900 '*** MENU Selection ***
2910 '
2920 M$(1)="Add":M$(2)="Edit":M$(3)="List (Selective)":M$(4)="Print-Copy ":M$(5)
="Create (New)":M$(6)="Kill (Existing)"
2930 LOCATE 23,1:COLOR 15,0:PRINT SPACES(80):LOCATE 23,1:PRINT"Menu Selections--
Hit [ space bar ] to CHANGE or [ ENTER ] to Select!
2940 SELECT=1
2950 CH$=INKEY$:IF CH$=""THEN 2950
2960 IF ASC(CH$)=32 THEN 2990 'update menu display
2970 IF ASC(CH$)=13 THEN 3080 'exit menu and branch to action
2980 GOTO 2950
2990 SELECT=SELECT+1:IF SELECT=7 THEN SELECT=SELECT-6
3000 SOUND 2600,.8
3010 IF SELECT=1 THEN LOCATE 5,64:COLOR 3,0:PRINT M$(6):LOCATE 5,3:COLOR 15,4:PR
INT M$(1)
3020 IF SELECT=2 THEN LOCATE 5,3:COLOR 3,0:PRINT M$(1):LOCATE 5,9:COLOR 15,4:PRI
NT M$(2)
3030 IF SELECT=3 THEN LOCATE 5,9:COLOR 3,0:PRINT M$(2):LOCATE 5,16:COLOR 15,4:PR
INT M$(3)
3040 IF SELECT=4 THEN LOCATE 5,16:COLOR 3,0:PRINT M$(3):LOCATE 5,35:COLOR 15,4:P
RINT M$(4)
3050 IF SELECT=5 THEN LOCATE 5,35:COLOR 3,0:PRINT M$(4):LOCATE 5,49:COLOR 15,4:P
RINT M$(5)
3060 IF SELECT=6 THEN LOCATE 5,49:COLOR 3,0:PRINT M$(5):LOCATE 5,64:COLOR 15,4:P
RINT M$(6)
3070 GOTO 2950
3080 ON SELECT GOTO 1540,1810,560,2100,250,1400
3090 '
3100 CLOSE 1:GOTO 2900
3110 '
3120 '*** Graphic TITLE Screen ***
3130 '
3140 KEY OFF:SCREEN 1,1:COLOR 0,7:CLS
3150 LINE(100,30)-(170,180),2,B:LINE(103,32)-(167,178),2,B:LINE(170,30)-(190,25)
,2:LINE-(120,25),2:LINE-(100,30),2:LINE(190,25)-(190,170),2:LINE-(170,180),2
3160 LINE(100,180)-(120,175),2:LINE-(120,30),2:LINE(120,175)-(167,175),2
3170 PAINT(175,40),3,2:PAINT(105,40),3,2:PAINT(125,28),1,2
3180 PUB$="Public Phone"
3190 X=6:Y=12
3200 FOR PT=1 TO 12:LOCATE X,Y:PRINT MID$(PUB$,PT,1):X=X+1:NEXT
3210 LINE(85,34)-(99,140),3,B:'PAINT(87,36),1,3
3220 LINE(138,60)-(148,80),1,BF:LINE-(153,76),1:LINE-(153,56),1:LINE-(148,60),1:
LINE(153,56)-(143,56),1:LINE-(138,60),1
3230 CIRCLE(143,65),4:CIRCLE(143,65),3:LINE(140,71)-(146,79),3,BF:LINE(150,63)-
(153,76),3,BF
3240 DRAW"bm140,97;cld2gl0f15e10h15":PAINT(140,102),2,1:DRAW"bm140,102;c1g6bf3e6
bf3g4"
3250 DRAW"BM220,110;c1r40d30L40U30E3R40G3BE3D30G3BH8BU5L25U5R25D5":PAINT(230,123
),3,1:PAINT(224,112),2,1
3260 LOCATE 15,30:PRINT "US":LOCATE 17,29:PRINT"MAIL":LOCATE 16,34:PRINT"<":LOC
ATE 15,36:PRINT"/"
3270 LOCATE 2,10:PRINT"P H O N E - B O O T H"
3280 LINE(40,0)-(280,20),2,B:LINE(41,1)-(279,19),1,B:LINE(42,2)-(278,18),3,B
3290 DRAW "bm151,77;c2d7gl11hlu4":DRAW"bm125,95;c2r30e2130f2"
3300 LINE(99,170)-(0,170),1:LINE(190,170)-(319,170),1:LINE(0,190)-(319,190),1
3310 FOR RING=1 TO 3:FOR K=2300 TO 1800 STEP-25:SOUND 1288,.37
3320 LINE(134,54)-(137,58),3:LINE(134,78)-(137,74),3:LINE(155,58)-(158,54),3:LIN
E(155,74)-(158,78),3
3330 FOR P=1 TO 10:NEXT:LINE(134,54)-(137,58),0:LINE(134,78)-(137,74),0:LINE(155
,58)-(158,54),0:LINE(155,74)-(158,78),0:NEXT
3340 FOR P=1 TO 1000:NEXT:NEXT RING
3350 LOCATE 23,30:PRINT "by L. Hyre"
3360 FOR P=1 TO 2000:NEXT P:RETURN
3370 FOR WIPE=8 TO 21:LOCATE WIPE,4:PRINT SPACES(74):NEXT WIPE:RETURN
3380 CLOSE:SYSTEM

```



*Allow your program to
make decisions with . . .*

BASIC Control Structures

By Richard A. White

Richard White has a long background with microcomputers and specializes in BASIC programming. He has authored numerous programs and articles. His work has also appeared in PCM's sister publication, THE RAINBOW.

A control structure is one of a number of statements that allows a program to make a choice. There is always some test made to determine which course of action to follow. Though the test may be complex and consist of a group of conditions, it boils down to either the conditions are true or false.

Consider the FOR . . . TO . . . NEXT control structure.

```
10 FOR X=1 TO 10
20 do something
50 finished doing it
60 NEXT
```

The first test is made when the NEXT in Line 60 is encountered. This means that the program will always *do something* at least once. When NEXT is encountered, X is incremented by one (the default since STEP was not specified), and a check is made to assure that X is equal to or less than 10. As long as this condition is true, the program returns to Line 20 and does "something" again.

Since X is just a variable like any other, you can use its value in your routine. A simple example is printing a menu where the menu text is in a string variable array called A\$(). Here is a program piece that does the job.

```
10 CLS : FOR X=1 TO 10
20 PRINT X;" ";A$(X)
30 NEXT
```

The menu produced looks like this on the screen.

```
1 Choice A
2 Choice B
3 Choice C
4 Choice D
5 Choice E
6 Choice F
7 Choice G
8 Choice H
9 Choice I
10 Choice J
```

By using STEP, you can count up or down and do so in increments other than one. All the following FOR . . . TO . . . STEP . . . NEXT statements will work.


```

10 FOR X=10 TO 0 STEP -1
20 ...
30 NEXT

100 FOR X=0 TO 1 STEP .01
110 ...
120 NEXT

200 FOR X=1 TO -1 STEP -.4
210 ...
220 NEXT

300 FOR X=A TO B STEP C
310 ...
320 NEXT

```

Here is a sneaky bit of code that gives an insight to the way FOR ... TO ... STEP ... NEXT works.

```

400 A=1:B=10:C=1
410 FOR X=A TO B STEP X+C : PRINT
    X" "; : NEXT

```

The output to the screen looks like this:

```

1 3 5 7 9

```

BASIC goes through the beginning of Line 10 only once, establishing the initial value of X, its ending value and the STEP increment. NEXT sends the program to the code just after the FOR ... TO ... STEP definition. This code may be on the same line or on a new line.

Want to lock up your computer? Here is an easy way:

```

500 FOR X=1 TO 2 : X=0 : NEXT

```

To drop out of the loop, X must reach a value greater than two when incremented by NEXT, but X always equals zero when the program reaches the NEXT. Now one would not be likely to want to do this on purpose, but anyone who has done much programming has probably done something like it by mistake.

If the start and end values are integer values and STEP is an integer value, use an integer value for the loop variable. This significantly speeds operation of the loop since BASIC can use integer arithmetic rather than floating point math. Remember, the percent sign (%) specifies an integer variable.

```

500 FOR COUNT%=1 TO 100 STEP 2
510 ...
520 NEXT

```

One place to purposely use a single or double precision count variable is when

using FOR ... TO ... NEXT as a program delay. FOR COUNT#=1 TO 2000 : NEXT works beautifully as a delay.

Note that I have never used the variable name after NEXT. NEXT COUNT% is acceptable code and some feel that it helps clarify a program. When memory is tight and every byte counts, then I am unwilling to waste bytes on unneeded names. If you do associate a variable with a NEXT, be sure it is the right one. BASIC knows full well which variable the NEXT is associated with and if you try to tell it something different, it will send a nastygram and quit.

FOR ... TO ... NEXT loops may be nested to any depth likely needed. Two- or three-deep nesting is very common.

If the test proves true, the code following the THEN is executed. The program either goes to the next line in the program or branches if a GOTO is encountered. Note that there may be one or more GOSUBs after the THEN, but the program always returns to finally move on to the next program line.

If the test proves false, control goes to the code following the ELSE, if there is one. ELSE is optional. One limit is the ELSE must be in the same line as the IF and THEN. This might force the use of subroutine calls (GOSUBs) if a substantial amount of processing is required after the THEN, the ELSE, or both. There are ways to do the same thing with GOTOs, but things get confusing. Forget

"One place to purposely use a single or double

precision count variable is when using FOR

... TO ... NEXT as a program delay."

It's here that it is easy to make a mistake when associating a variable name with a NEXT. Still, to make the association clear, I will show the associated variables in the following program that prints the multiplication table to the screen.

```

10 CLS:FOR X= TO 9:FOR Y=0 TO 9
20 PRINT X*Y; :NEXT Y :PRINT
30 NEXT X

```

There is more to program control than looping to a certain count. IF ... THEN ... ELSE is another workhorse control structure. If you could have only one control structure, it would have to be IF ... THEN ... ELSE because you can make it do the same job any of the other control structures can do. The others exist to make programming easier, but are not critical to being able to write a program.

In the beginning, there was IF ... THEN. Then ELSE was added and how crude life was in the early days became apparent.

There are three parts to an IF ... THEN ... ELSE statement. A test is performed after the IF key word. The test may be simple or complex, but BASIC boils it down to a final true or false and acts according to the result.

GOTO is in BASIC if at all possible. Look how straightforward subroutine calls can be.

```

1100 IF TESTWORD$="MORE" THEN
    FLAG$="TRUE":GOSUB
    20:GOSUB 50 ELSE FLAG$=
    "FALSE":GOSUB 30:GOSUB 50

```

Here we made the test and set an initial condition, FLAG\$="TRUE" or FLAG\$="FALSE", and went off to two subroutines. All sorts of activity could have occurred in the subroutines, but the program still returns to Line 1100 when all is accomplished and "top-down" program flow continues. The fact that the subroutines are at the beginning of the program does not upset the top-down concept since it refers to flow within the particular program module. In PASCAL, everything you are ever going to need in procedures or subroutines must come before the "main" procedure.

Any test will include one or more relational operators. These are equal, (=), less than (<) and greater than (>); they may be combined.

<= or =	less than or equal
>= or >	greater than or equal
<> or <	not equal

Logical operators are also provided and include AND, OR, NOT, XOR, EQV and IMP. AND, OR and NOT are most frequently used, as shown in the examples provided.

```
IF COST <= PRICE THEN PROFIT =
PRICE - COST ELSE LOSS = COST -
PRICE
IF A$ <> "CONDITION1" AND
B<=100 THEN . . . ELSE . . .
IF C$ = "SOMETHING" AND ( C >
10 OR D > 100) THEN . . .
IF NOT WARM THEN TEMP$ = "COLD"
```

Obviously there are all sorts of things that can be tested. The first example is a simple "less than or equal" test. The < > essentially means "not equal to." It is typically used when comparing strings. There is also an AND in the example. It forces both conditions to be met before the test is "true." The third line contains two tests within parentheses. They are joined by an OR, which requires that only one be true for the parentheses to be true. The last example is a bit obscure. Microsoft BASIC uses zero to indicate false. Any other number indicates true.

You can make major programming errors by setting up code after the IF

without getting an error message. BASIC tries to do what you want, ends up with a true or false determination, and continues on.

IF . . . THEN . . . ELSE statements can be nested. The limit is how many you can get in one line. You can sometimes use ANDs and ORs after the first IF to do the same thing nested IFs do. Look at your problem both ways.

WHILE . . . WEND provides loop control with the test at the beginning of the loop. If the test proves false, program control goes to the statement immediately following WEND. The test may be any of the types used after IF. One nice feature is WEND may be on a different line from its WHILE. This means WHILE . . . WENDs may be nested to any level and large amounts of code may be involved between a WHILE statement and its WEND.

Each WEND is matched to the most recent WHILE. There must be a WEND for each WHILE and vice versa. Failure to have this match causes "WHILE without WEND" or "WEND without WHILE" error messages.

WHILE . . . WEND is particularly useful in controlling a loop where work continues until some definable finish criteria is met. A bubble sort is a simple

example. Suppose strings are held in an array with J members. The task is to start at the top of the array and compare two members. If a swap criteria is met, the two strings are swapped. Then, the second string is compared with the third and a swap is made if the criteria is met. Multiple passes are made until the array is in order. This is detected when there are zero swaps in a pass. Here is a short program to do this.

```
200 'Bubble sort array A$( )
210 SWAPS=1 'Force one pass
    through the array
220 WHILE SWAPS
230 SWAPS=0
240 FOR I=1 TO J-1
250 IF A$(I) > A$(I+1) THEN SWAP
    A$(I),A$(I+1): SWAPS=1
260 NEXT I: WEND
```

SWAPS need only be set to one to force another pass. When the list is in order, SWAPS will remain zero and the loop will be exited.

The last set of control structures is of the ON . . . GOSUB and ON . . . GOTO type. They cause a branching to one of a number of lines depending on which of a number of criteria has been met. We will save these for next month. **PCM**

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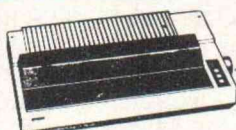
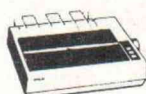
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"Ahead, Mr. Sulu. Warp Factor One. Thataway."

Star Trek

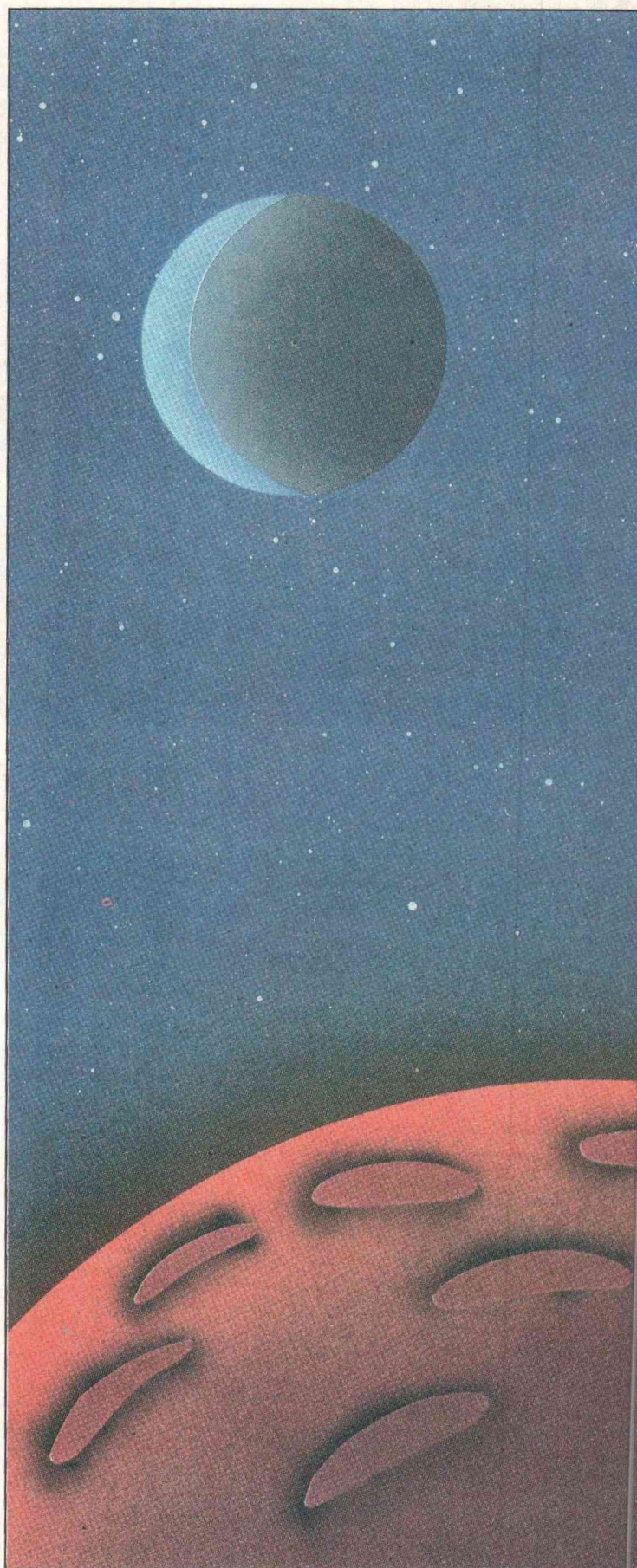
By John D. Shewchuk

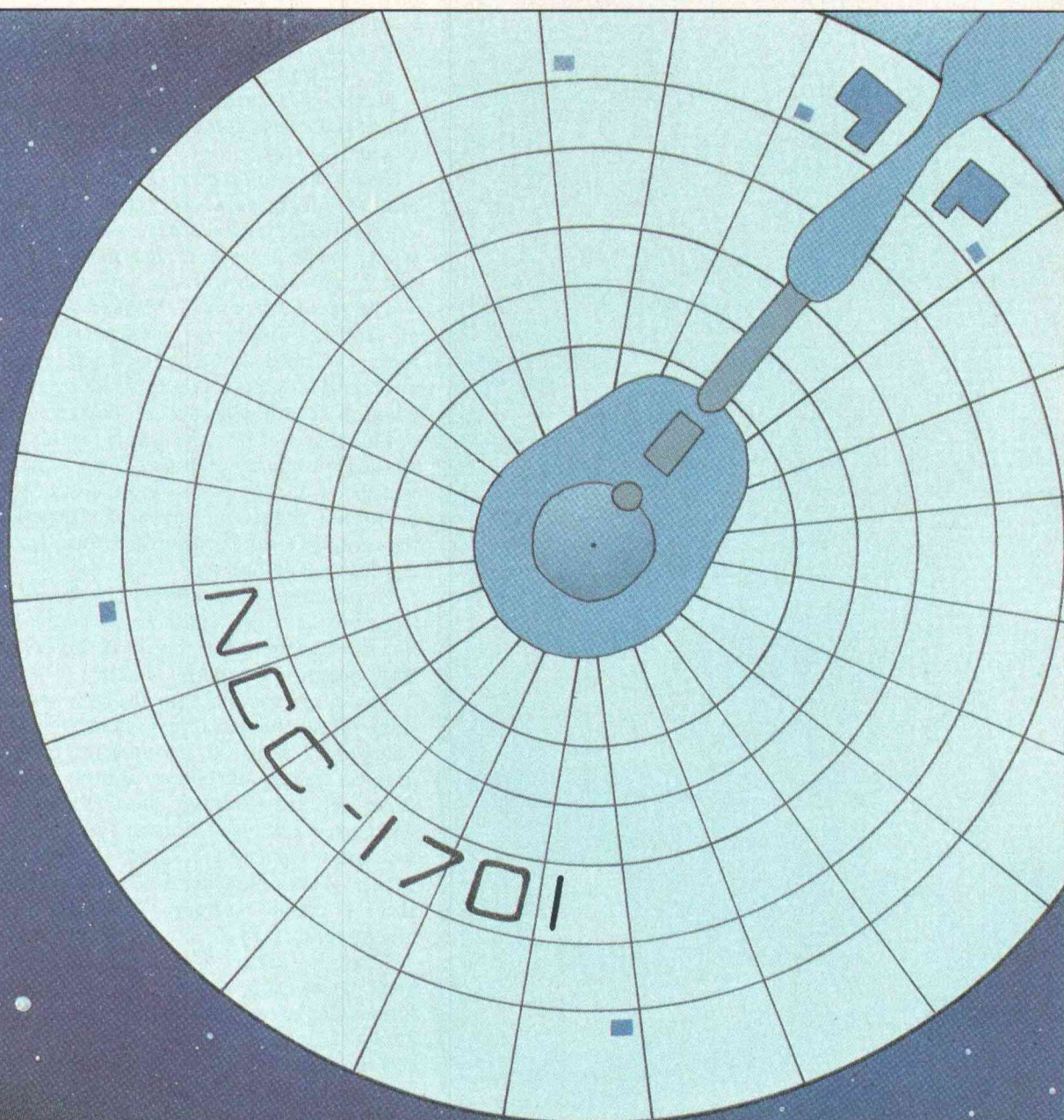
Tired of all those *Star Trek* "batch-type" games? You know, the type that allows a light-year between plays like chess or checkers. Did you ever see Scotty stand still for anything? Mr. Spock would say, "How illogical." Well, this *Star Trek* game is "real-time"! It's a fast-paced, continuous-action fight to the finish. Both color and sound aid you (the Captain) to battle the enemy. Once the enemy is sighted, there is no turning back, and it's too late to review the ship's operating manuals. Luckily, Mr. Spock, Lt. Uhuru, Scotty and Sulu are on the bridge with you. With this game, you "earn" your efficiency rating.

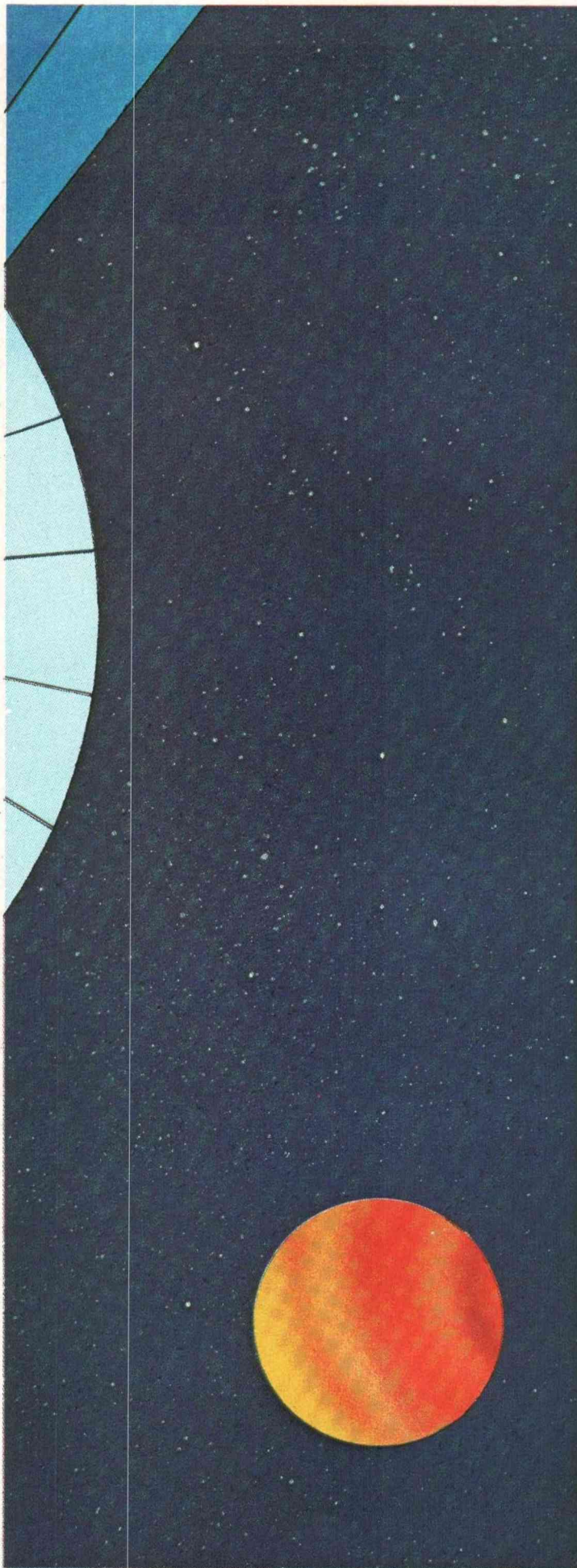
This game makes use of many of the unique capabilities of the Tandy 1000's GW-BASIC. It will not work on IBM-type machines, primarily due to the use of the screen Mode 6 graphics, which allows both text and color graphics on the same screen. Tandy's unique SOUND, NOISE and PLAY commands are also used throughout the program for added realism. The minimum facilities required to play this game are: a Tandy 1000 with GW-BASIC, an RGB monitor, at least 256K memory, good eyes and ears, a strong cardiovascular system and — most importantly — a logical mind.

The program is subdivided into four parts: the title screen, the menu (with internal documentation), the game playing and your rating. All sections are relatively short and simple, except the game, which constitutes 80 percent of the program.

John Shewchuk is manager of over 60 computer programmers and systems analysts at the U.S. Air Force's Global Weather Central, Offutt AFB in Omaha, Nebraska. He has master's degrees in meteorology and public administration. He developed this program partially for his own pleasure and experience and partially for his wife, Judy, an original die-hard Trekker.







The Program

The title section starts with (you guessed it) a star scene and other *Star Trek* opening texts and themes. The screen turns into a colorful, musical display to satisfy the needs of those "Trekkies" who are truly addicted to the words — *Star Trek*. This display used the handy RESTORE command (Line 1880) for this sequence.

Next comes the menu. Here you are given your first three options: 1) view game rules, 2) view keyboard controls or 3) start the game.

The game rules consist of three pages of text, which outline information necessary toward understanding the capabilities of the *Enterprise* and the enemy. There are three types of enemies: a Romulan probe, a Klingon battle cruiser and Khan's warship. Each type increases in difficulty.

The second option, keyboard controls, shows a display of Tandy's numeric keypad section and the functions they represent (note: the NUM LOCK light must be on). The other keyboard controls are located in the function keys F1 through F8. All controls are located in logical patterns.

The last option, the game, is a non-stop Adventure against the enemy of your choice, which can only end with your final rating (last program section). Oh yes, Mr. Spock personally determines each of your efficiency ratings and recommends appropriate actions. Let's hope you don't display any emotions.

Knowledge of the rules and keyboard controls is essential to a successful encounter. Knowledge of the rules is helpful, but the experience of battle is the best teacher. This *Star Trek* program is a game of skill.

The captain's chair (keyboard) has the following functions: First, the numeric keypad section. All number keys, 1 through 9, are used. In numerical order, the functions are: impulse engine start, rear photon torpedo launch, hyperdrive, left turn, phaser blast (forward only), right turn, decrease warp speed, forward photon torpedo launch and increase warp speed. Second, the function keys, from F1 to F8, are: shields on, shields off, phasers on, phasers off, repair shields, repair weapons (phasers & torpedoes), repair ergosystems (ship's five support systems) and repair engines.

That's it, folks. All keys respond in real-time through the INKEY\$ function, which is always in a continuous loop (this loop is the heart of the main program in lines 3190 through 3450). There is, however, a slight response delay to commands when one of the program subroutines is active (such as repair activities or enemy actions). The computer remembers each and every keyboard command, and each command will eventually activate its respective function. Novice Captains almost always become over-anxious and give the *Enterprise* several commands before the enemy makes a corresponding response. One important rule is the *Enterprise* permits an unlimited number of commands before the enemy responds, except for one command type — a weapons release (this rule allows the enemy a fighting chance). Beware — hesitation or lack of commands will result in the *Enterprise's* destruction, a very low efficiency rating and worst of all — Mr. Spock's disapproval.

A few words about the battle screen. It is split into two parts — the command and tactical screens. The command screen echos commands, the responses from the crew and other *Enterprise*/enemy statistics. The tactical screen performs only graphical activities, once text labels are established. The combination of the two screens' text and graphics updates gives an accurate and timely status of all pertinent information about the battle — except what the

galley is cooking for supper

This battle screen is created in four steps. First, screen Mode 6 is used to allow a combination of high resolution color graphics and 80-column text. Next, VIEW is used to define the tactical portion of the screen (viewport) for graphics use. Third, WINDOW SCREEN is used to redefine the tactical screen's viewport in terms of "world coordinates" for ease of use. Finally, the *Enterprise's* initial text and graphics information is entered onto the battle screen.

A note for those who only have Tandy's originally supplied BASIC information booklet, *A Reference Guide*; it indicates that screen Mode 6 has a "color set" of 16. Not true! Tandy's expanded BASIC *Reference Manual* (\$35) accurately indicates a "one" palette capability, which just allows four colors (Line 2830).

The objective of this game is to rid the Federation of hostile intruders. Simple? Well, for the Romulan probe, this may be true, but the Klingon and Khan encounters become increasingly difficult.

Enemy difficulty incorporates the following program activities: increased weapon releases, faster speeds, quicker repairs, more accurate weaponry and improved evasive tactics. The majority of these functions are located in lines 4330 through 5050. This section also includes the main space vector calculation logic. Each time the enemy position and statistics are updated on the screen, this logic uses trigonometry to recalculate the position of the enemy relative to the *Enterprise* (movement of the *Enterprise* is subtracted from the enemy's movement).

Enemy statistics are updated via screen text about once every second. The enemy's relative position to the *Enterprise* is displayed graphically using a red dot on a circular viewport. Dot positions are updated through a combination of the CIRCLE and PAINT commands (lines 4890 through 4900). The *Enterprise* vector arrow within this same viewport is updated using 36 different DRAW calls (lines 5250 through 5740) representing the 36 points of the compass. Before the arrow is updated with the new DRAW command, it has to be "blackened out" with a call to the previous DRAW. This also occurs for the enemy's red dot.

The first executable line of this program uses a powerful option of Tandy's BASIC language — the CLEAR command. In this program, CLEAR, ,1500,32768 is used. The 32,768 "video memory" value is necessary to access screen Mode 6. This also (unfortunately) requires more than the Tandy 1000's standard system of 128K RAM. The 1,500 "stack space" value was added to this program after the fact. During program development, I kept getting "Out of Mem-

ory" errors in the FOR/NEXT loops. After lots of headaches, I finally realized that the solution lay within this CLEAR command option. I used the 1,500 value, which is about double the default 768-byte value, and have had no trouble since.

This program uses the random number generator (RND) and the internal clock function (TIMER) throughout. These statements give this program a controlled degree of uncertainty and the real-time activities necessary for this type of game. The RND function is used primarily within the code that determines the enemy's activities — within predetermined limits. The TIMER function is needed mostly to keep track of spacecraft repair activities.

I'd like to make special mention of three versatile audio commands available in Tandy's BASIC and used throughout this program — PLAY, SOUND and NOISE. Hopefully your internal Tandy 1000 speaker works, otherwise you will miss an important dimension to this game. (Maybe someday this GW-BASIC will also allow stereo sound.)

The powerful PLAY command is used mostly for musical tunes. The longest tune used was the *Star Trek* theme (lines 1760 through 1790). It had to be divided into four sections because the PLAY buffer can only hold a limited number of notes at one time.

The SOUND command is also very powerful and used mostly for sound effects. The most effective application of the SOUND command was the simulation of the doppler effect of an enemy's plasma bolt (or whatever they fire at us) as it whizzes by the *Enterprise* (lines 4290 through 4310). Note that SOUND options (frequency, duration and volume) were all varied for this effect.

The NOISE command was only used to give the *Enterprise's* engines a representative background sound with an appropriate volume (Line 6880). This NOISE command was especially useful, since it can simultaneously operate with either the PLAY or SOUND commands. A valuable feature of all three "sound" commands is the option to specify volume. Other GW-BASICs do not allow the volume option.

Before trying this game, be sure to read the internal documentation associated with the first two options in the main menu — the rules and the controls. Each option has three pages of information.

The third main menu option puts you in the captain's chair. Don't forget to keep those shields up. Go ahead and clean the Federation of all those intruders and make Spock proud of you. Remember, it's only a game — so have fun!

The listing:

```
10 REM *****
20 REM
30 REM          STARTREK -- A Real Time Game !
40 REM
50 REM      by John D. Shewchuk * 1968 * Version 1.0
60 REM
70 REM          for the Tandy 1000, w/256K
80 REM
90 REM *****
100 REM
110 CLEAR, ,1500,32768: KEY OFF: N=1
120 GOTO 1540
130 SCREEN 0: KEY OFF: COLOR 10,9,13: CLS
140 PRINT "
150 PRINT "          >>>  S T A R T R E K  <<<"
```



```

160 PRINT "":PRINT
170 PRINT " * A Real-Time Game *":PRINT
180 COLOR 13: FOR I = 1 TO 80: PRINT CHR$(177);NEXT I:PRINT:COLOR 11:PRINT
190 PRINT " THE MENU : "
200 PRINT "":PRINT
210 PRINT " 1 - The Rules":PRINT
220 PRINT " 2 - The Controls":PRINT
230 PRINT " 3 - The Game":PRINT
240 COLOR 13: FOR I = 1 TO 80: PRINT CHR$(177);NEXT I:PRINT:PRINT:COLOR 7
250 PRINT:PRINT " by John D. Shewchuk -- 1986"
260 LOCATE 24,32: PRINT "[ Version 1.0 ]";
270 AS="": AS=INKEY$: IF AS="" THEN 270 ELSE 280
280 IF AS=CHR$(50) THEN 310
290 IF AS=CHR$(49) THEN 870
300 IF AS=CHR$(51) THEN 1950 ELSE 270
310 COLOR 10,1,4: CLS: PRINT
320 PRINT " *** BE SURE 'NUM LOCK' KEY IS ON ***"
330 PRINT
340 PRINT "
350 PRINT "
360 PRINT "
370 PRINT "
380 PRINT "
390 PRINT "
400 PRINT
410 PRINT "
420 PRINT "
430 PRINT "
440 PRINT "
450 PRINT "
460 PRINT "
470 PRINT
480 PRINT "
490 PRINT "
500 PRINT "
510 PRINT "
520 PRINT "
530 PRINT "
540 LOCATE 25,8: PRINT "Press any key to continue . . ."
550 AS="": AS=INKEY$: IF AS="" THEN 560 ELSE 550
560 CLS: PRINT: PRINT
570 PRINT " *** BATTLE SUPPORT COMMANDS ***":PRINT:PRINT
580 PRINT " F1 - SHIELDS ON F2 - SHIELDS OFF":PRINT
590 PRINT " F3 - PHASERS ON F4 - PHASERS OFF"
600 PRINT:PRINT:PRINT
610 PRINT " ----- SHIP'S REPAIR ACTIVATORS -----":PRINT
620 PRINT " F5 - SHIELDS":PRINT
630 PRINT " F6 - WEAPONS (PHASERS & PHOTON TORPEDOS)":PRINT
640 PRINT " F7 - ERGOSYSTEMS (ALL 5 FUNCTIONS)":PRINT
650 PRINT " F8 - DILITHIUM CRYSTALS (ENGINES)":PRINT
660 LOCATE 25,8: PRINT " Press any key to continue . . ."
670 AS="": AS=INKEY$: IF AS="" THEN 680 ELSE 670
680 CLS: PRINT
690 PRINT " *** CONTROL CHARACTERISTICS ***":PRINT
700 PRINT " * The computer remembers and executes all function commands"
710 PRINT " entered. The program will consecutively execute all those"
720 PRINT " entered, until a phaser or torpedo is fired -- after which"
730 PRINT " the enemy then takes a turn.":PRINT
740 PRINT " * The program will wait about 1 second after your last command"
750 PRINT " before the enemy executes the next command.":PRINT
760 PRINT " * The repair function for Ergosystem #2 (Life Support - Oxygen)"
770 PRINT " must be activated within 10 seconds of enemy hit. Ship's Hull"
780 PRINT " (Ergosystem #1) will fail when hit twice, even if the Hull is"
790 PRINT " being repaired after the first hit. Use those shields.":PRINT
800 PRINT " * All functions are echoed on the Command Screen, except the"
810 PRINT " Left & Right turn keys (#4 & #6, respectively).":PRINT
820 PRINT " * Portions of the program's openings can be skipped by pressing"
830 PRINT " any key. They are: the Star scene, the Title scene, and the"
840 PRINT " Coded Message scene."
850 LOCATE 25,20: PRINT "Press any key for Menu . . ."
860 AS="": AS=INKEY$: IF AS="" THEN 130 ELSE 860
870 COLOR 10,,2: CLS: PRINT
880 PRINT " ***** This game has the Vulcan Seal of Approval *****"
890 PRINT "":PRINT

```


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```

900 PRINT " * Difficulty -- Romulan Star Scout > EASY"
910 PRINT " -- Klingon Battle Cruiser > MODERATE"
920 PRINT " -- Khan's Warship > HARD": PRINT
930 PRINT " * Objective: There is only one winner - the Enterprise or the Enemy"
940 PRINT: PRINT " * Weapons -- The Enterprise:": PRINT
950 PRINT " - Phasers - Range: 10,000 KM"
960 PRINT " Direction: Foreward only"
970 PRINT " - Torpedos - Range: 20,000 KM"
980 PRINT " Direction: Front and rear"
990 PRINT " Replenish: Only following Hyper-Drive"
1000 PRINT: PRINT " -- The Enemy:": PRINT
1010 PRINT " - Type: Plasma Bolts"
1020 PRINT " - Range: 20,000 KM"
1030 PRINT " - Direction: Any angle; foreward is most accurate"
1040 LOCATE 25,25: PRINT "Press any key to continue . . ."
1050 AS="": AS=INKEY$: IF AS="" THEN 1050 ELSE 1060
1060 CLS
1070 PRINT " * Defense -- Shields ( 2 banks )"
1080 PRINT " -- Enemy avoidance ( via speed and direction )": PRINT
1090 PRINT " * Engines -- Impulse engines can only be started ... not stopped"
1100 PRINT " -- Warp speeds range from 1 to 10; Enemy warps go higher"
1110 PRINT " The Enemy has no Hyper-Drive (count your blessings). "
1120 PRINT " -- Hyper-Drive gets Enterprise to StarBase 6 ";
1130 PRINT "(only if enough power)"
1140 PRINT " then the Enemy continues the attack !"
1150 PRINT " Note: Each Hyper Flight reduces available power"
1160 PRINT
1170 PRINT " * Ergosystems -- Hull: Consists of inner and outer structures"
1180 PRINT " -- Oxy: Life support (oxygen, etc) systems"
1190 PRINT " -- Aim: Target acquisition and aiming capabilities"
1200 PRINT " -- Dat: Sensor data readings on enemy"
1210 PRINT " -- Com: Internal ship communications circuits": PRINT
1220 PRINT " * Repairs -- Enterprise repairs are activated via F5 - F8"
1230 PRINT " (Ergosystem repair selection [F7] is pre-set)"
1240 PRINT " -- Enterprise and Enemy repairs are internally"
1250 PRINT " prioritized and timed according to difficulty": PRINT
1260 PRINT " * Note: The capability/advantage of turning 'off' the"
1270 PRINT " Shields and Phasers [F2 & F4] is to free power"
1280 LOCATE 24,10: PRINT "if extra is needed to achieve Hyper-Drive";
1290 LOCATE 25,53: PRINT "Press any key to continue...";
1300 AS="": AS=INKEY$: IF AS="" THEN 1300 ELSE 1310
1310 CLS: PRINT
1320 PRINT " * Color Codes:"
1330 PRINT " -- Light Blue - system OK / activated"
1340 PRINT " -- Red - system damaged / inactive"
1350 PRINT " -- Yellow - system under repair & still inactive"
1360 PRINT " until repairs are completed (computer controlled)"
1370 PRINT " Note: engine colors reflect engine speeds - not damage"
1380 PRINT: PRINT " * Damages:"
1390 PRINT " -- Shields are first systems damaged upon enemy hit."
1400 PRINT " After shields are gone (red or yellow), all other"
1410 PRINT " ship's sytems are liable targets."
1420 PRINT " -- Damage to both dilithium crystals prevent warp speeds."
1430 PRINT " Further damage (one more hit) stops impulse engines."
1440 PRINT
1450 PRINT " * Phasers and forward torpedos usually hit enemy only when the"
1460 PRINT " Enterprise vector (bearing) arrow points toward the enemy"
1470 PRINT " position (red dot). Note: Skill can be achieved by leading the"
1480 PRINT " target using data displayed on the Enemy Status screen -- use of"
1490 PRINT " enemy's bearing and warp speed data are essential.": PRINT
1500 PRINT " * Enemy evasive actions, offensive tactics, and repair activities"
1510 PRINT " improve with selected degree of difficulty.": PRINT
1520 LOCATE 25,26: PRINT "Press any key for Menu . . .";
1530 AS=INKEY$: IF AS="" THEN 1530 ELSE 130
1540 OPTION BASE 1: TIMER ON: SCREEN 0
1550 DIM KB(2,36), SS(6), TE(5)
1560 GOTO 1590: REM - NEXT 2 LINES IS A JUMP FORWARD SUBROUTINE
1570 K$ = INKEY$: IF K$ <> "" THEN 1580 ELSE RETURN
1580 GOTO 130
1590 SCREEN 6: CLS: RANDOMIZE TIMER
1600 FOR I = 1 TO 200: GOSUB 1570
1610 MX = INT(RND*639)+1: NX = INT(RND*190)+1: PSET (MX,NX),9: NEXT I
1620 PRINT: PRINT: PRINT: PRINT: PRINT: PRINT: J = 500
1630 STARSS = "MB05T40V9MLC.04G.B-.F.P30C.03G.B-.F."

```



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1640 COLOR 1: PLAY STARSS
1650 PRINT "      SPACE";: FOR I = 1 TO J: GOSUB 1570: NEXT I
1660 PRINT " -- THE FINAL FRONTIER.":: FOR I = 1 TO J: GOSUB 1570: NEXT I
1670 PRINT "  THESE ARE THE VOYAGES OF"
1680 PRINT: PRINT "      THE STARSHIP ENTERPRIZE, HER FIVE MINUTE MISSION --":
1690 FOR I = 1 TO J: GOSUB 1570: NEXT I
1700 PRINT : PRINT "      TO EXPLORE STRANGE NEW WORLDS, TO SEEK OUT NEW LIFE";
1710 PRINT " AND NEW CIVILIZATIONS,": FOR I = 1 TO J: GOSUB 1570: NEXT I
1720 PRINT: PRINT "      TO BOLDLY GO WHERE NO MAN HAS GONE BEFORE."
1730 FOR I = 1 TO J: GOSUB 1570: NEXT I:
1740 SCREEN 0:COLOR 0,0,0:CLS
1750 DIM CL(5): CL(1)=176:CL(2)=8:CL(3)=223:CL(4)=219:CL(5)=178
1760 X$="C.O4C.T190 O3 B-AGFE T60 E-. T120 D. O4 D. T190 C O3 B-AGF T60 E. P16"
1770 Y$="EF.G T210 AB- O4 CDE- T120 E. T100 F. P16"
1780 Z$="AG.A T210 B- O4 CDEF T120 F+. T100 G. P16 O3 B-4"
1790 A$="O3 MB ML T120": DIM CLR(5)
1800 CLR(1)=14: CLR(2)=4: CLR(3)=3: CLR(4)=5: CLR(5)=1
1810 PLAY A$+X$
1820 FOR J = 1 TO 5
1830 COLOR CLR(J),J,CLR(J)
1840 FOR I = 1 TO 223
1850 K$ = INKEY$
1860 IF K$ <> "" THEN 130
1870 READ L,M: LOCATE L,M: PRINT CHR$(CL(J))
1880 NEXT I: RESTORE
1890 IF J = 1 THEN PLAY A$+Y$+A$+Z$
1900 IF J = 2 THEN PLAY A$+X$
1910 IF J = 3 THEN PLAY A$+Y$+A$+Z$
1920 NEXT J
1930 COLOR 26,12: LOCATE 21,26: PRINT " **** Fasten Seatbelts **** "
1940 FOR I = 1 TO 500: GOSUB 1570: NEXT I: GOTO 130
1950 SOUND OFF: SOUND ON: COLOR 5,2,12: CLS
1960 FOR I = 1 TO 3: SOUND 500*I,2,11: NEXT I
1970 LOCATE 1,1: FOR I = 1 TO 80: PRINT CHR$(210):; NEXT I
1980 LOCATE 5,1: FOR I = 1 TO 80: PRINT CHR$(208):; NEXT I
1990 DATE = INT(RND*777777!)/100 + 1000.11
2000 LOCATE 3,32: COLOR 1: PRINT "STARDATE " DATE: COLOR 14,1
2010 PLAY "O3 V11 T120 MB MS C4C16G.T255B-8G8E8C."
2020 LOCATE 7,10: PRINT "Welcome aboard the StarShip Enterprise."
2030 LOCATE 9,10: PRINT "This is Lt Uhura."
2040 LOCATE 11,10: PRINT "Please enter your name in the Admiral's Log."
2050 LOCATE 13,30: COLOR 0,2: INPUT: "", NA$
2060 IF LEN(NA$) < 10 THEN 2130
2070 LOCATE 13,30: FOR I = 1 TO LEN(NA$): PRINT " ";: NEXT I
2080 PLAY "T255 CAE"
2090 LOCATE 7,10: PRINT "OK Captain -- We know you're proud of your heritage,"
2100 LOCATE 9,10: PRINT "But these computers can only handle 9 alphanumerics,"
2110 LOCATE 11,10: PRINT "So let's try it one more time [P.S. Spock's watching]."
2120 GOTO 2050
2130 COLOR 14,1: LOCATE 15,10: PRINT "Thank you Captain " NA$ ". "
2140 PLAY "V10 MN T255 O6 C8C8"
2150 FOR I = 1 TO 1000: NEXT I: COLOR 14,1,1
2160 LOCATE 17,1: FOR I = 1 TO 80: PRINT CHR$(32):; NEXT I
2170 PLAY "T225O1C1602C1603C1604C1605C1606C16"
2180 LOCATE 18,1: PRINT "Sir, urgent coded message arriving from "
2190 LOCATE 18,41: PRINT "StarFleet Command ....."
2200 FOR I = 1 TO 1000: NEXT I
2210 LOCATE 19,1: FOR I = 1 TO 80: PRINT CHR$(32):; NEXT I: COLOR 12
2220 FOR J = 20 TO 23: FOR I = 1 TO 80: LOCATE J,I,0: K$=INKEY$
2230 SOUND INT(RND*4000)+1000,.8,10: IF K$ <> "" THEN 2480
2240 PRINT CHR$(RND*221+33):; NEXT I: NEXT J
2250 FOR I = 1 TO 1000: NEXT I
2260 COLOR 11,1,6: CLS
2270 PRINT "  Ship's computer now decoding message....."
2280 COLOR 15: PRINT: SOUND ON: FOR I = 1 TO 3: SOUND I*2000,2,15: NEXT I
2290 FOR I = 1 TO 2000: NEXT I: SOUND 1000,15,11: COLOR 14
2300 PRINT SPC(10) CHR$(4) "  CONDITION YELLOW " CHR$(4): PRINT: COLOR 7
2310 FOR I = 1 TO 900: NEXT I: SOUND 4000,5,12
2320 PRINT SPC(10) CHR$(4) "  StarBase #" INT(RND*9+1);
2330 PRINT "reports unidentified craft,"
2340 X = INT(RND*9+1)
2350 FOR I = 1 TO 900: NEXT I: SOUND 4000,5,12
2360 PRINT SPC(10) CHR$(4) "  approaching at WARP Factor" X ". "
2370 FOR I = 1 TO 900: NEXT I: SOUND 4000,5,12

```


Ready,



Cat. No. 26-1280

Dot Matrix Printer
DMP 130

Set,

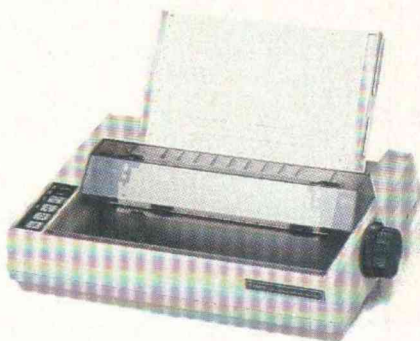
Print!

```
July 23, 1984
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230, Delaware
St. North, St. 14102.
Dear Mr. Turner:
...
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```


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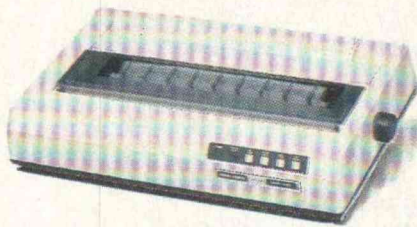
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If you're looking for an affordable printer, you'll find our DMP 105 is ideal. This speedy printer produces 80 upper and lower case characters per line at 43 lines per minute (80 cps). With a bit-image graphics mode and removable adjustable tractor, our DMP 105 is a true performer! (26-1276, \$199.95.)



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2380 PRINT SPC(10) CHR$(4) " You must stop their advance at all cost."
2390 X = INT(RND*9+1)
2400 FOR I = 1 TO 900: NEXT I: SOUND 4000,5,12
2410 PRINT SPC(10) CHR$(4) " Identify your last known contact in Sector" X ",,"
2420 FOR I = 1 TO 900: NEXT I: SOUND 4000,5,12
2430 PRINT SPC(10) CHR$(4) " Proceed at once !"
2440 FOR I = 1 TO 900: NEXT I: SOUND 5000,5,13
2450 PRINT SPC(10) CHR$(4) " < END OF MESSAGE >"
2460 FOR I = 1 TO 2000: NEXT I
2470 GOTO 2490
2480 COLOR 11,1,8: CLS: PRINT:PRINT:PRINT: X=INT(RND*9+1)
2490 COLOR 1,2,8: SOUND ON: NOISE 3,11,32000
2500 PRINT " "
2510 PRINT " *** Computer Memory: Sector " X ". "
2520 PRINT " "
2530 FOR I = 1 TO 1000: NEXT I
2540 PRINT " >>> Enter 1 - Romulan Probe "
2550 PRINT " >>> Enter 2 - Klingon Battle Cruiser "
2560 PRINT " >>> Enter 3 - Khan's Warship "
2570 PRINT " "
2580 A$ = ""
2590 A$ = INKEY$: IF A$ = "" THEN 2590
2600 IF A$ = "1" THEN EN=4: EM=7: ME=2: EN$="ROMULAN": GOTO 2640
2610 IF A$ = "2" THEN EN=3: EM=4: ME=4: EN$="KLINGON": GOTO 2640
2620 IF A$ = "3" THEN EN=2: EM=2: ME=6: EN$="KHAN'S": GOTO 2640
2630 GOTO 2580
2640 SOUND ON: SOUND 777,20,8
2650 COLOR 12,1: EMISS=EN*14: MEX=ME+5
2660 FOR I = 1 TO 80: PRINT CHR$(254);: NEXT I:PRINT:FOR I = 1 TO 500:NEXT I
2670 COLOR 20,3,4:LOCATE 20,25: PRINT " C O N D I T I O N - R E D "
2680 FOR J=1 TO 5:FOR I=1 TO 10:SOUND I*500,.5,12:SOUND I*1000,.5,12:NEXT I,J
2690 COLOR 10,0
2700 LOCATE 24,13: PRINT "Captain " NA$ " !";
2710 LOCATE 24,31: PRINT " >>> You're wanted on the Bridge.";: PLAY OFF
2720 TS = "03 V11 T120 MF MS C4C16G. T255 C8E8F8G8 T150 B-. 04 T50 C."
2730 PLAY TS
2740 REM ***** MAIN PROGRAM *****
2750 REM ***** INITIALIZATION *****
2760 FOR I = 1 TO 6: SS(I)=0: NEXT I: FOR I = 1 TO 5: TE(I)=0: NEXT I
2770 SCREEN 6: CLS: TIMER ON: TIMEX=TIMER: MISS=0: PA=0: PO=0: SP=0: SX=0
2780 KP=25: PR=30: ZAP=0: TORMIS=0: YD=0: SD=0: PD=0: TD=0: CD=0: TL=0: SH=0
2790 TS=0: TT=0: TP=0: TC=0
2800 SOUND ON: PLAY "T99MBO5V9ML C.04G.B-.F.P30G.03G.B-.F."
2810 EE = 30: REM - ENTERPRIZE REPAIR TIMER FACTOR
2820 GOSUB 2830: GOTO 2840
2830 PALETTE 3,1:PALETTE 0,3: PALETTE 2,14: PALETTE 1,12: RETURN
2840 FOR I = 1 TO 12: KEY I, "": NEXT I
2850 REM -- W1$ - W3$ ARE FOR WORK PARTY SOUNDS
2860 REM W1$ = "MBV10L16T25504C.FGEDC+FFG-CEA."
2870 REM W2$ = "MBV10L16T255MLO5EFG+G+GE-DA+CGDF"
2880 REM W3$ = "MBV10L16T255MSO3A.DAGFE-DCC+BG"
2890 KB(1,1)=340:KB(2,1)=49:KB(1,2)=347:KB(2,2)=52:KB(1,3)=353:KB(2,3)=55
2900 KB(1,4)=357:KB(2,4)=59:KB(1,5)=361:KB(2,5)=63:KB(1,6)=364:KB(2,6)=68
2910 KB(1,7)=366:KB(2,7)=73:KB(1,8)=368:KB(2,8)=79:KB(1,9)=368:KB(2,9)=85
2920 KB(1,10)=368:KB(2,10)=91:KB(1,11)=366:KB(2,11)=97:KB(1,12)=364:KB(2,12)=102
2930 KB(1,13)=361:KB(2,13)=107:KB(1,14)=357:KB(2,14)=111:KB(1,15)=353
2940 KB(1,16)=347:KB(2,16)=118:KB(1,17)=340:KB(2,17)=120:KB(1,18)=333
2950 KB(1,19)=326:KB(2,19)=120:KB(1,20)=319:KB(2,20)=118:KB(1,21)=313
2960 KB(1,22)=309:KB(2,22)=111:KB(1,23)=305:KB(2,23)=107:KB(1,24)=302
2970 KB(1,25)=300:KB(2,25)=97:KB(1,26)=298:KB(2,26)=91:KB(1,27)=298:KB(2,27)=85
2980 KB(1,28)=298:KB(2,28)=79:KB(1,29)=300:KB(2,29)=73:KB(1,30)=302:KB(2,30)=68
2990 KB(1,31)=305:KB(2,31)=63:KB(1,32)=309:KB(2,32)=59:KB(1,33)=313:KB(2,33)=55
3000 KB(1,34)=319:KB(2,34)=52:KB(1,35)=326:KB(2,35)=49:KB(1,36)=333:KB(2,36)=48
3010 KB(2,15)=115:KB(2,18)=121:KB(2,21)=115:KB(2,24)=102
3020 WR$="** WARNING ** Insufficient Power **": MS$="Mr Spock, ":MZ$="Sulu, "
3030 RA$="Raise shields quick.": LO$="Lower shields.": SR$="Sir, "
3040 CA$="Captain ": SC$="Scotty, ": RP$="- Repeat your order Sir."
3050 AD$=" are damaged!": TT$="Torpedo tubes": PB$="Phaser banks"
3060 CD$=" crystal damaged!": WE$="Warp engines"
3070 CM$="Main computers": LS$="Long range sensors": TS$="Targeting systems"
3080 LF$="Life support systems": HL$="Ship's structures"
3090 EX=36: SH=0: DY=3: KX=36: ER=0: KF$="": K$=""
3100 KH!=0: KV!=25000: KD=180: KS=3: RG=25000
3110 PT=10: PX=0: GOSUB 3490: CDPR=3

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3120 LOCATE 5,7: PRINT CAS NAS "....."
3130 LOCATE 7,7: PRINT "Target is rapidly approaching."
3140 VT = TIMER: QT=10+(EM*4): REM - ENEMY REPAIR TIMER
3150 KEY 1,"S": KEY 2,"L": KEY 3,"P": KEY 4,"O"
3160 KEY 5,"C": KEY 6,"W": KEY 7,"E": KEY 8,"D"
3170 NV=0: HYPER=0
3180 SOUND ON
3190 TM = TIMER: SOUND ON: NOISE 2,NV,32000
3200 SOUND 1986,3,11
3210 GOSUB 4140
3220 GOSUB 4200
3230 GOSUB 8710
3240 COUNT = 0
3250 AS = INKEY$: COUNT = COUNT + 1
3260 IF AS = "" THEN 3450
3270 IF AS = CHR$(49) THEN GOSUB 6230: GOTO 3250: REM - 1, IMPULSE
3280 IF AS = CHR$(83) THEN GOSUB 5820: GOTO 3250: REM - F1, SHIELDS ON
3290 IF AS = CHR$(80) THEN GOSUB 7100: GOTO 3250: REM - F3, PHASERS ON
3300 IF AS = CHR$(51) THEN GOSUB 6270: GOTO 3250: REM - 3, HYPER
3310 IF AS = CHR$(67) THEN GOSUB 8310: GOTO 3250: REM - F5, FIX SHIELDS
3320 IF AS = CHR$(87) THEN GOSUB 8370: GOTO 3250: REM - F6, FIX WEAPONS
3330 IF AS = CHR$(69) THEN GOSUB 8510: GOTO 3250: REM - F7, FIX SYSTEMS
3340 IF AS = CHR$(68) THEN GOSUB 8450: GOTO 3250: REM - F8, FIX ENGINES
3350 IF AS = CHR$(55) THEN GOSUB 6280: GOTO 3250: REM - 7, WARP -
3360 IF AS = CHR$(53) THEN GOSUB 7290: GOTO 3190: REM - 5, PHASER
3370 IF AS = CHR$(57) THEN GOSUB 6290: GOTO 3250: REM - 9, WARP +
3380 IF AS = CHR$(52) THEN GOSUB 5260: GOTO 3250: REM - 4, LEFT
3390 IF AS = CHR$(56) THEN GOSUB 7440: GOTO 3190: REM - 8, TORPEDO ^
3400 IF AS = CHR$(54) THEN GOSUB 5280: GOTO 3250: REM - 6, RIGHT
3410 IF AS = CHR$(76) THEN GOSUB 5760: GOTO 3250: REM - F2, SHIELDS OFF
3420 IF AS = CHR$(79) THEN GOSUB 7190: GOTO 3250: REM - F4, PHASERS OFF
3430 IF AS = CHR$(50) THEN GOSUB 3460: GOTO 3190: REM - 2, TORPEDO AFT
3440 GOTO 3250
3450 IF COUNT > 50 THEN 3190 ELSE 3250
3460 REM ***** AFT TORPEDO LAUNCH *****
3470 XE=EX: EX=EX+18: IF EX>35 THEN EX=EX-36
3480 GOSUB 7440: EX=XE: RETURN
3490 REM ***** TACTICAL SCREEN SETUP *****
3500 VIEW (0,102)-(639,199),3
3510 WINDOW SCREEN (0,0)-(400,140):PAINT (240,125),3
3520 FOR I = 1 TO 80: PRINT CHR$(220);: NEXT I
3530 PRINT CHR$(221) SPC(10);
3540 PRINT "USS ENTERPRISE COMMAND SCREEN";
3550 PRINT SPC(10) CHR$(219) " ";
3560 PRINT EN$ " STATUS ";
3570 PRINT CHR$(222);
3580 FOR I = 1 TO 80: PRINT CHR$(223);: NEXT I
3590 PRINT CHR$(221) SPC(49) CHR$(219) SPC(28) CHR$(222);
3600 PRINT CHR$(221) SPC(49) CHR$(219) " Range: KM ";
3610 PRINT CHR$(222);
3620 PRINT CHR$(221) SPC(49) CHR$(219) " Heading: " CHR$(248);
3630 PRINT SPC(6) CHR$(222);
3640 PRINT CHR$(221) SPC(49) CHR$(219) " Warp # : " SPC(13) CHR$(222);
3650 PRINT CHR$(221) " ";
3660 PRINT CHR$(219) " " CHR$(222);
3670 FOR I = 6 TO 8:PRINT CHR$(221) SPC(49) CHR$(219) SPC(28) CHR$(222);: NEXT I
3680 FOR I = 1 TO 80: PRINT CHR$(220);: NEXT I
3690 PRINT CHR$(219) SPC(24);
3700 PRINT "T A C T I C A L S C R E E N ";
3710 PRINT SPC(25) CHR$(219);
3720 LOCATE 15,3
3730 PRINT "Impulse W A R P Hyper"
3740 LOCATE 15,62: PRINT "Target Bearing"
3750 LOCATE 16,3: PRINT "Engines 1 2 3 4 5 6 7 8 9 10 Drive"
3760 LOCATE 16,62: PRINT "Enterprise Bearing"
3770 LOCATE 19,7: PRINT "Shields"
3780 LOCATE 19,24: PRINT "Phasers": LOCATE 19,38: PRINT "Photon-Torpedos"
3790 LOCATE 22,6: PRINT "Ship's ErgoSystems "
3800 LOCATE 22,35: PRINT "Dilithium Crystals"
3810 LOCATE 23,6: PRINT "Hull Oxy Aim Dat Com"
3820 LOCATE 23,37: PRINT " # 1 # 2 "
3830 VIEW PRINT 4 TO 11
3840 CIRCLE (333,85),29,2,,,45: SOUND 4000,1,11
3850 CIRCLE (333,85),42,2,,,45: SOUND 4500,1,12

```



```

3860 PSET (333,85),2: DRAW "TA360 N D9 U13"+"TA140 N U5"+"TA220 U5": EX=36
3870 PSET (283,30),2: DRAW "A3 U13" + "TA50 N U5" + "TA140 U5"
3880 CIRCLE (291,19),3,1: PAINT (293,19),1
3890 LINE (9,40)-(53,52),2,B: REM FOR IMPULSE ENGINES
3900 FOR I = 1 TO 10: LINE (41+I*16,40)-(55+I*16,52),2,B
3910 SOUND 500*I,1,(2+I): NEXT I
3920 LINE (218,40)-(261,52),2,B: REM FOR HYPER DRIVE
3930 LINE (15,73)-(80,90),2,B: REM FOR SHIELDS
3940 SOUND 1000,2,11
3950 LINE (111,81)-(133,72),2: LINE (133,72)-(155,81),2: REM PHASER TOP
3960 LINE (111,81)-(133,90),2: LINE (133,90)-(155,81),2: REM PHASER BOTTOM
3970 SOUND 2000,2,11
3980 LINE (180,74)-(264,91),2,B
3990 SOUND 3000,2,11
4000 FOR I = 1 TO 5: J = I * 21
4010 LINE (11+J,120)-(20+J,126),2: LINE (20+J,126)-(11+J,133),2
4020 LINE (11+J,133)-(2+J,126),2: LINE (2+J,126)-(11+J,120),2
4030 IF YD=1 THEN RETURN ELSE PAINT (5+J,126),0,2:SOUND 700*I,1,11: NEXT I
4040 GOSUB 4050: GOTO 4060
4050 CIRCLE (196,127),6,2: PAINT (196,127),0,2: RETURN: REM D.C. #1
4060 SOUND 1000,1,11:SOUND 2000,1,12:SOUND 1000,1,13
4070 GOSUB 4080: GOTO 4090
4080 CIRCLE (240,127),6,2: PAINT (240,127),0,2: RETURN: REM D.C. #2
4090 SOUND 1000,1,11:SOUND 2000,1,12:SOUND 1000,1,13
4100 LOCATE 10,3: PRINT "Available Generator Power " CHR$(16) " 100%"
4110 LOCATE 10,60: PRINT "Status:"
4120 GOSUB 7250
4130 RETURN
4140 REM ***** OXYGEN *****
4150 IF SS(2)=0 OR TE(2)>0 THEN RETURN
4160 IF (TM-TL) < 12 THEN RETURN ELSE Z$="*** Life Support Failure ***"
4170 GOSUB 6010: FOR I = 1 TO 15: SOUND 3000,5,I: LOCATE 6,12
4180 COLOR 1: PRINT Z$: SOUND 1000,5,I: LOCATE 6,12
4190 PRINT "": NEXT I: GOTO 9130
4200 REM ***** HIT ON ENTERPRISE ? *****
4210 IF RG>20000 THEN 4340
4220 L=INT(RND*EM)*2: IF L=2 THEN 4230 ELSE 4340
4230 FOR I = 1 TO 3: SOUND 2000,1,15: SOUND 1000,1,14: NEXT I: SOUND 600,1,15
4240 GOSUB 6010: LOCATE 6,7: PRINT CA$ NA$ " - We're under attack!"
4250 X1=ABS(EX-KX): IF X1>18 THEN X1=36-X1
4260 L=INT(RND*(X1/3+SP+KS+EMISS))
4270 REM * THIS FACTORS ENEMY TYPE AND DAMAGE INTO HIT ON ENTERPRISE
4280 IF L<(KP+MEX) THEN GOSUB 7580: GOTO 4340
4290 FOR I = 0 TO 15: FOR J = 1000 TO 400 STEP -100: SOUND J,1,I: NEXT J,I
4300 FOR K = 15 TO 0 STEP -1: FOR L = 1300 TO 300 STEP -100
4310 SOUND L,2,K: NEXT L,K: GOSUB 6010: LOCATE 6,7
4320 PRINT "Sir .... That was a near miss!": SOUND 3000,2,13
4330 REM ***** VECTOR CALCULATIONS BETWEEN SPACE-CRAFT *****
4340 TV=TIMER-VT
4350 GOSUB 5210
4360 IF SP=0 THEN X=10: GOTO 4380
4370 IF SP=1 THEN X=10 ELSE X=25*(SP-1)
4380 X = X * TV
4390 AN! = EX * .1745329
4400 EV! = X * COS(AN!)
4410 EH! = X * SIN(AN!)
4420 X = KS * 25 * TV
4430 IF KHIT > 0 THEN 4450
4440 IF HIT = 0 THEN 4500
4450 IF KHIT=2 THEN KHIT=0: GOTO 4500
4460 KHIT = KHIT + 1
4470 IF KHIT > 1 THEN 4490
4480 IF RG = 2*INT(RG/2) THEN SIGN = -1 ELSE SIGN = 1
4490 KD = KD + SIGN*(INT(RND*ME*5)+ME*7): REM-FACTORS ENEMY VEERING IF HIT
4500 AN! = KD * 1.745329E-02
4510 KH! = KH! + (X*SIN(AN!))-EH!
4520 KV! = KV! + (X*COS(AN!))-EV!
4530 RG! = SQR(KH!*KH! + KV!*KV!)
4540 IF RG!>30000 THEN RG! = 30000: KD=KD+45
4550 RG = CINT(RG!)
4560 IF VV>0 THEN 4580
4570 IF RG<30000 THEN KD=KD+(15+RND*(ME+KP)): KS=KS+ME: VV=1: GOTO 4420
4580 IF KV!=0 THEN KV! = .0001
4590 KB = ABS(INT(ATN(KH!/KV!) * 57.29578))

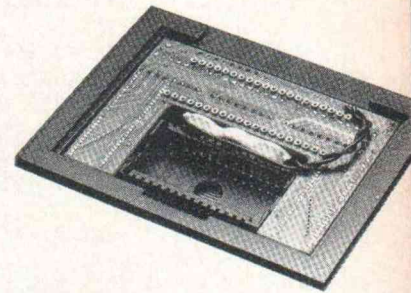
```


Give your Model 100

128K

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Software included, transfers from bank to bank. Works like main menu! Includes powerful RAM Basic that lets programs store and access data from any other bank.

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As amazing as it seems you can upgrade your Model 100 to 128K of RAM in just 60 seconds.

It comes to you right out of the box looking just like the picture. You just open the little compartment on the back of your Model 100 with a quarter and it just pushes right into place. You can then put the cover back in its place.

You then have 4 banks of RAM of 32K each. The additional three banks also work just like your Main Menu.

You push a function key and you are in the second bank. Push again and you are in third, again, then fourth. Press it once again for your original bank.

It has its own built-in NiCad battery that recharges right from the Model 100 and its guaranteed for a full year.

What is really great is that you can copy a file from one bank to another with just a function key.

Each bank is like having another Model 100, and all the built-in programs as well as any snap-in ROM programs appear in all four banks and work the same way. Your widebar cursor moves from file to file and you access any file or run any program just by pressing ENTER.

What lets you copy any file from one bank to another is a snap-in ROM from PCSG called RAM+, that comes at no extra charge. It just pushes right into the little socket in that same compartment with the 96K expansion unit.

Not only does this firmware let you copy a file from bank to bank, but you can make a copy of any file within the same bank instantly with a function key. Great for Lucid spreadsheets!

Copy a file from bank to bank with a function key

You can also rename a file, or kill any file with just a function key. Plus you can do a whole lot of other useful things like setting the date, day and time with function key ease. You even have a function key that lets you use non-Radio Shack printers without having to make those tricky dipswitch settings.

RAM+ lets you cold start any one of your banks without affecting the other three. That means that anytime you want you can clean out a bank's entire memory, but leave intact all the files in the other banks.

What is also fantastic is that you don't have to have the ROM in place to use the additional RAM. Whenever you take out the snap-in ROM it leaves behind a tiny machine code program that lets you switch from bank to bank just by pressing ENTER.

This lets you use your ROM socket to snap-in other ROMs like LUCID spreadsheet, WRITE ROM text processor, or DISK+ ROM file transfer program, and use them in any or all four banks. All of these, by the way, are available from PCSG.

When you are ready to copy a file from one bank to another or use any of the other fantastic functions we talked about you can just snap the RAM+ ROM back into place.

Everybody that has this 128K system in their Model 100 is so excited, because it gives them four times the capacity and all banks work just like the Main Menu.

And what has made a lot of people happy is that the system bus, located in the same compartment, is left free for you to plug in a DVI or the Holmes Engineering PCSG portable disk drive.

The ability to copy a file from bank to bank instantly with a function key, plus all of the other features make this RAM extension truly an engineering masterpiece.

Some people hesitate when they think of installing something, and then others are skeptical that any additional hardware could be as good as the Model 100 itself. That's why we sell these 96K expansions on a 30 day trial. Simply return it within 30 days for a full refund if you are not satisfied. Priced at \$425. MC VISA COD.

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```

4600 IF KV!<0 AND KH!<0 THEN KB=KB+180: GOTO 4640
4610 IF KV!>0 AND KH!>0 THEN 4640
4620 IF KH!>0 THEN KB=180-KB: GOTO 4640
4630 KB=360-KB
4640 X! = PR/15!
4650 IF X!>1! THEN X!=1!
4660 X = INT(9*X!)
4670 KS = CINT(X*SIN(160*RG/30000*1.745329E-02))+CINT(30-KP)/(EM+1)
4680 IF VV=2 THEN KS=KS+ME*2
4690 IF VV=0 THEN 4730 ELSE IF VV=2 THEN 4710
4700 IF RG<15000 THEN 4720 ELSE VV=0: GOTO 4730
4710 IF RG>15000 THEN VV=0: GOTO 4730
4720 X = SIGN*EN*10: GOTO 4760
4730 X! = KP/15
4740 IF X!>1! THEN X!=1!
4750 X=CINT(180*X!)
4760 IF KS>20 THEN KS=20
4770 KD = KB+X+INT(RND*KS*2)
4780 IF KD>360 THEN KD=KD-360
4790 IF KD<1 THEN KD=1
4800 IF SS(4)=0 THEN 4840 ELSE 4870: REM - NEXT 3 LINES ARE A SUBROUTINE
4810 LOCATE 5,67: PRINT "?????"
4820 LOCATE 6,70: PRINT "???"
4830 LOCATE 7,67: PRINT "???": RETURN
4840 LOCATE 5,67: PRINT USING "##,###"; CINT(RG!)
4850 LOCATE 6,69: PRINT USING " ###"; KD
4860 LOCATE 7,67: PRINT INT(KS)
4870 KQ! = KB
4880 KB = KB/10: IF KB < 1 OR KB > 35 THEN KB = 36
4890 PAINT (KB(1,KX),KB(2,KX)),3
4900 CIRCLE (KB(1,KB),KB(2,KB)),3,1: PAINT (KB(1,KB),KB(2,KB)),1
4910 KX=KB
4920 REM * KP IS USED TO FACTOR ENEMY HIT ON ENTERPRISE
4930 IF KP<11 AND KF$="YELLOW" THEN KF$="RED ": COLOR 1,2: GOTO 4980
4940 IF KP<21 AND KF$="GREEN " THEN KF$="YELLOW": COLOR 2,3: GOTO 4980
4950 IF KP>10 AND KF$="RED " THEN KF$="YELLOW": COLOR 2,3: GOTO 4980
4960 IF KF$="GREEN " THEN 5030
4970 IF KP>20 THEN KF$="GREEN ": COLOR 3,0: GOSUB 2830
4980 IF K$<>KF$ THEN 4990 ELSE 5030
4990 LOCATE 10,68: PRINT KF$: COLOR 3,0: GOSUB 2830
5000 FOR K = 5 TO 15: SOUND 1500,.7,K: NEXT K
5010 SOUND 2000,1,15
5020 K$=KF$
5030 VT=TIMER
5040 IF VV=1 THEN VV=2
5050 RETURN
5060 REM ***** HIT ON ENEMY? *****
5070 LOCATE 7,6: HIT = 0
5080 X=INT(ABS(10*EX-KQ!)): IF X>180 THEN X=360-X
5090 IF X > (11-SS(3)) THEN 5100 ELSE 5130
5100 PRINT " Sir ..... we missed.": MISS=MISS+2
5110 PLAY "O2 V12 T150 MF C4 O2 E-16G8F16E-16D16C"
5120 GOTO 5240
5130 IF X > (6-SS(3)) THEN 5140 ELSE 5170
5140 PRINT " We just missed " CA$ NA$ ".": MISS=MISS+1
5150 PLAY "O3 V12 T150 MF C4 O2 E-16G8F16E-16D16C"
5160 GOTO 5240
5170 PRINT " - - DIRECT HIT - - -"
5180 PLAY "O3 V12 T180 MF C4C16E16G8E16G16 O4 C"
5190 KP=KP-5: HIT=1: ZAP=ZAP+1
5200 IF KP=0 THEN 9130 ELSE 5210
5210 IF TIMER>TQ AND KP<30 THEN 5220 ELSE 5240
5220 KP=KP+5
5230 TQ=TIMER+QT
5240 RETURN
5250 REM ***** ENTERPRISE BEARING *****
5260 IF(EX=1) THEN EB=36 ELSE EB=EX-1
5270 GOTO 5290
5280 EB=EX+1: IF(EX=36) THEN EB=1
5290 PS=3: PLAY "V10T25505F"
5300 PSET (333,85),PS
5310 IF (EX>24) THEN NX=EX-24: GOTO 5350
5320 IF (EX>12) THEN NX=EX-12: GOTO 5340
5330 ON EX GOTO 5360,5370,5380,5390,5400,5410,5420,5430,5440,5450,5460,5470

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5340 ON NX GOTO 5480,5490,5500,5510,5520,5530,5540,5550,5560,5570,5580,5590
5350 ON NX GOTO 5600,5610,5620,5630,5640,5650,5660,5670,5680,5690,5700,5710
5360 DRAW "TA350 N D9 U13"+"TA130 N U5"+"TA210 U5": GOTO 5720
5370 DRAW "TA340 N D9 U13"+"TA120 N U5"+"TA200 U5": GOTO 5720
5380 DRAW "TA330 N D9 U13"+"TA110 N U5"+"TA190 U5": GOTO 5720
5390 DRAW "TA320 N D9 U13"+"TA100 N U5"+"TA180 U5": GOTO 5720
5400 DRAW "TA310 N D9 U13"+"TA90 N U5"+"TA170 U5": GOTO 5720
5410 DRAW "TA300 N D9 U13"+"TA80 N U5"+"TA160 U5": GOTO 5720
5420 DRAW "TA290 N D9 U13"+"TA70 N U5"+"TA150 U5": GOTO 5720
5430 DRAW "TA280 N D9 U13"+"TA60 N U5"+"TA140 U5": GOTO 5720
5440 DRAW "TA270 N D9 U13"+"TA50 N U5"+"TA130 U5": GOTO 5720
5450 DRAW "TA260 N D9 U13"+"TA40 N U5"+"TA120 U5": GOTO 5720
5460 DRAW "TA250 N D9 U13"+"TA30 N U5"+"TA110 U5": GOTO 5720
5470 DRAW "TA240 N D9 U13"+"TA20 N U5"+"TA100 U5": GOTO 5720
5480 DRAW "TA230 N D9 U13"+"TA10 N U5"+"TA90 U5": GOTO 5720
5490 DRAW "TA220 N D9 U13"+"TA360 N U5"+"TA80 U5": GOTO 5720
5500 DRAW "TA210 N D9 U13"+"TA350 N U5"+"TA70 U5": GOTO 5720
5510 DRAW "TA200 N D9 U13"+"TA340 N U5"+"TA60 U5": GOTO 5720
5520 DRAW "TA190 N D9 U13"+"TA330 N U5"+"TA50 U5": GOTO 5720
5530 DRAW "TA180 N D9 U13"+"TA320 N U5"+"TA40 U5": GOTO 5720
5540 DRAW "TA170 N D9 U13"+"TA310 N U5"+"TA30 U5": GOTO 5720
5550 DRAW "TA160 N D9 U13"+"TA300 N U5"+"TA20 U5": GOTO 5720
5560 DRAW "TA150 N D9 U13"+"TA290 N U5"+"TA10 U5": GOTO 5720
5570 DRAW "TA140 N D9 U13"+"TA280 N U5"+"TA360 U5": GOTO 5720
5580 DRAW "TA130 N D9 U13"+"TA270 N U5"+"TA350 U5": GOTO 5720
5590 DRAW "TA120 N D9 U13"+"TA260 N U5"+"TA340 U5": GOTO 5720
5600 DRAW "TA110 N D9 U13"+"TA250 N U5"+"TA330 U5": GOTO 5720
5610 DRAW "TA100 N D9 U13"+"TA240 N U5"+"TA320 U5": GOTO 5720
5620 DRAW "TA90 N D9 U13"+"TA230 N U5"+"TA310 U5": GOTO 5720
5630 DRAW "TA80 N D9 U13"+"TA220 N U5"+"TA300 U5": GOTO 5720
5640 DRAW "TA70 N D9 U13"+"TA210 N U5"+"TA290 U5": GOTO 5720
5650 DRAW "TA60 N D9 U13"+"TA200 N U5"+"TA280 U5": GOTO 5720
5660 DRAW "TA50 N D9 U13"+"TA190 N U5"+"TA270 U5": GOTO 5720
5670 DRAW "TA40 N D9 U13"+"TA180 N U5"+"TA260 U5": GOTO 5720
5680 DRAW "TA30 N D9 U13"+"TA170 N U5"+"TA250 U5": GOTO 5720
5690 DRAW "TA20 N D9 U13"+"TA160 N U5"+"TA240 U5": GOTO 5720
5700 DRAW "TA10 N D9 U13"+"TA150 N U5"+"TA230 U5": GOTO 5720
5710 DRAW "TA0 N D9 U13"+"TA140 N U5"+"TA220 U5"
5720 IF (PS = 2) THEN 5740
5730 PS = 2: EX = EB: GOTO 5300
5740 RETURN
5750 REM ***** SHIELDS *****
5760 GOSUB 5990: LOCATE 5,7: PRINT MS$ LO$: IF SH=0 THEN 5970
5770 IF SH=1 THEN 5790
5780 FOR I = 12 TO 8 STEP -1: SOUND 666,1,I: NEXT I: PAINT (60,80),3: PR=PR+2
5790 FOR I = 8 TO 4 STEP -1: SOUND 666,1,I: NEXT I: PAINT (25,80),3: PR=PR+2
5800 SH=0
5810 LOCATE 7,7: PRINT "Sir, Shields deactivated.": GOTO 5980
5820 GOSUB 5990: LOCATE 5,7: PRINT MS$ RA$: IF SH=2 THEN 5970
5830 IF SD=0 THEN 5850 ELSE LOCATE 7,7: PRINT SR$ "Shields" AD$
5840 GOSUB 6150: GOTO 8650
5850 IF PR>10 THEN 5870
5860 LOCATE 7,7:PRINT CA$ "- we have no more shield power!":GOTO 5840
5870 IF SH=1 THEN 5910
5880 LINE (64,87)-(17,87),0:LINE (17,87)-(17,76),0:LINE (17,76)-(64,87),0
5890 FOR I = 4 TO 8:SOUND 666,1,I:NEXT I:PAINT (25,80),0:PR=PR-2:SH=1
5900 IF SD=1 THEN 5930
5910 IF PR>8 THEN 5930 ELSE LOCATE 7,7: PRINT "Only 50% Shield activation."
5920 GOTO 5950
5930 LINE (31,76)-(78,76),0:LINE (78,76)-(78,87),0:LINE (78,87)-(31,76),0
5940 FOR I = 8 TO 12:SOUND 666,1,I:NEXT I:PAINT (60,80),0:PR=PR-2:SH=2
5950 IF SD=1 THEN RETURN
5960 LOCATE 7,7: PRINT "Shields FIRM.": GOTO 5980
5970 LOCATE 7,7: PRINT CA$ RP$: GOSUB 6150
5980 GOSUB 6180: RETURN
5990 REM ***** ZAP SCREEN *****
6000 SOUND 500,1,8
6010 FOR I = 5 TO 7: LOCATE I,3
6020 PRINT "
6030 NEXT I: RETURN
6040 REM ***** BLAST/LAUNCH RANGE/HIT *****
6050 X=0
6060 IF X$ = "L" THEN 6070 ELSE 6090
6070 IF RG>20000 THEN 6080 ELSE 6140

```


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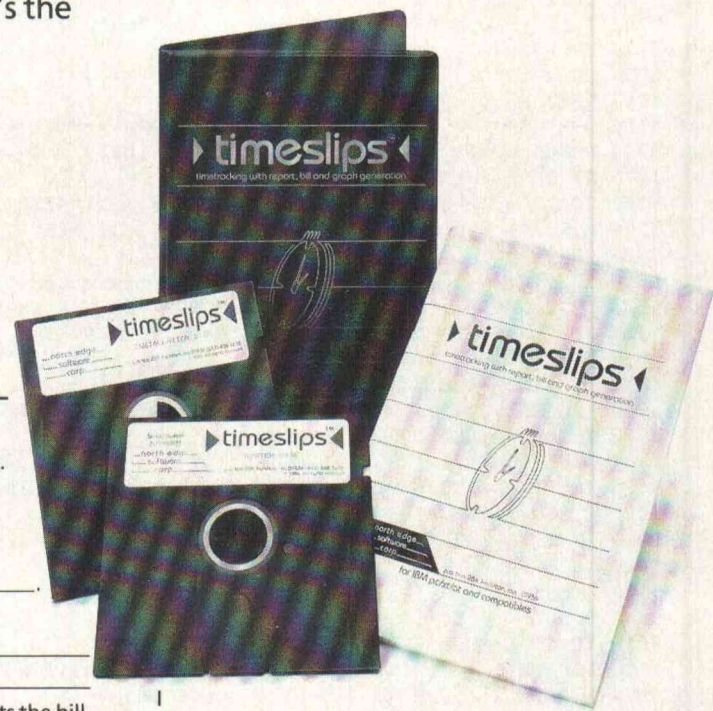
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6080 X=1: XS = " Torpedo": TORMIS=TORMIS+1: GOTO 6110
6090 IF RG>10000 THEN 6100 ELSE 6140
6100 X=1: XS = " Phaser"
6110 LOCATE 6,4
6120 PRINT SPC(4) EN$ " target out of" XS " range!"
6130 FOR I = 10 TO 1 STEP -1: SOUND 200*I,.1,10: NEXT I
6140 RETURN
6150 REM ***** RESPONSE *****
6160 SOUND 3000,5,10:SOUND 2000,4,10:SOUND 3000,3,10
6170 RETURN
6180 REM ***** POWER % *****
6190 IF SS(5)=1 THEN RETURN
6200 LOCATE 10,31: PRINT USING "###"; CINT(PR*3.33)
6210 RETURN
6220 REM ***** ENGINE SPEED *****
6230 GOSUB 5990: LOCATE 5,7:PRINT SC$ "Give me Impluse Power."
6240 IF DY=0 THEN LOCATE 7,7: PRINT SR$ "Impulse engines" AD$: GOTO 6580
6250 IF PR>5 THEN SP=1: GOTO 6380
6260 GOTO 6550
6270 GOSUB 5990:LOCATE 5,7:PRINT SC$"Give me Hyper-Drive - now!":SP=12:GOTO 6370
6280 GOSUB 5990: X=0: W$="Decrease": GOTO 6300
6290 GOSUB 5990: W$="Increase": X=1
6300 LOCATE 5,7:PRINT SC$ W$ " our WARP Factor."
6310 IF X=1 AND SX=0 THEN 6320 ELSE 6330
6320 LOCATE 7,7: PRINT CA$ " , power up Impulse Engines first.": GOTO 6150
6330 IF X=1 THEN 6360
6340 IF SX<2 THEN 6400 ELSE SP=SX-1
6350 GOTO 6370
6360 IF SX=11 THEN 6400 ELSE SP=SX+1
6370 IF DY<2 THEN LOCATE 7,7: PRINT SR$ W$ AD$: GOTO 6580
6380 IF(SP>SX) THEN 6410
6390 IF(SP<SX) THEN 6630
6400 LOCATE 7,7:PRINT CA$ NA$ " " RP$: GOTO 6150
6410 IF(SP=1)THEN 6420 ELSE IF(SP=12) THEN 6530 ELSE 6460
6420 I=1: GOSUB 6840: LINE (12,43)-(50,49),0,BF
6430 IF(SP>1) THEN SX=1: GOTO 6460
6440 LOCATE 7,7:PRINT CA$ "- Impulse power attained.": PR=PR-1
6450 SX=SP: GOTO 7080
6460 IF(SX=0) THEN 6420
6470 S2=SP-1: XS=SX: FOR I = XS TO S2: IF(I=11) THEN 6540
6480 IF PR<I THEN SX=I: GOTO 6550
6490 GOSUB 6840: PR=PR-1: SX=SX+1: GOSUB 6880
6500 LINE (43+I*16,43)-(53+I*16,49),2,BF: NEXT I
6510 LOCATE 7,7:PRINT "WARP Factor #" SP-1 "has been achieved."
6520 SX=SP: GOTO 7080
6530 IF (SX<11) THEN 6460
6540 IF PR>12 THEN 6560 ELSE SX=11
6550 LOCATE 7,7: PRINT WR$: GOSUB 6150: GOTO 7080
6560 IF DY=3 THEN 6600 ELSE SX=11: GOSUB 6010: LOCATE 5,6: PRINT CA$ NA$
6570 LOCATE 7,6: PRINT "We need both engines for Hyper-Drive!"
6580 GOSUB 6150: PLAY "O5T250V11GFG"
6590 GOTO 7080
6600 LINE (221,43)-(258,49),1,BF
6610 GOSUB 6890
6620 SX=12: SP=0
6630 REM - GO SLOWER
6640 IF(SX=1) THEN 6760
6650 IF(SX<12) THEN 6700
6660 GOSUB 6860
6670 PAINT (225,45),3,2: SX=11: PR=PR+1
6680 IF(SP<11) THEN SX=11: GOTO 6700
6690 GOTO 6740
6700 STP=SX-1: FOR I = STP TO SP STEP -1: IF(I=0) THEN 6760
6710 PR=PR+1: SX=SX-1: GOSUB 6880
6720 PAINT (48+I*16,46),3: GOSUB 6860
6730 NEXT I
6740 IF (SP=1) THEN 6750 ELSE 6510
6750 PR=PR+1: GOTO 6440
6760 I=1
6770 PAINT (20,45),3: GOSUB 6860
6780 SX=0: PR=PR+1
6790 LOCATE 6,7:PRINT CA$ NA$ " - all engines stop ! " : HYPER=HYPER+1
6800 SOUND 1111,10,14: PR=PR-4: IF DY=0 THEN RETURN
6810 PT=10: GOSUB 7250: VT=0: GOSUB 4330

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6820 IF GO=1 THEN RETURN
6830 RG=25000: VT=TIMER: KH!=0: KV!=25000: KD=1: KS=3: GOTO 7080
6840 FOR K = 1 TO 12: FOR J = 1 TO 5: SOUND 25*K*I,.05,K: NEXT J: NEXT K
6850 GOTO 6880
6860 FOR K = 12 TO 1 STEP -1: FOR J = 1 TO 5
6870 SOUND 25*K*I,.05,K,2: NEXT J: NEXT K
6880 NV=(SX+2)/2: SOUND ON: NOISE 2,NV,32000: RETURN
6890 REM ***** SOUND FOR HYPER-WARP *****
6900 GOSUB 5990
6910 FOR I = 1 TO 10: COLOR 2
6920 LOCATE 6,15: PRINT "H Y P E R - D R I V E"
6930 FOR J = 400 TO 1000 STEP 100
6940 SOUND J,.2,11
6950 M = 900 - J
6960 SOUND M,.2,11,1
6970 NEXT J
6980 LOCATE 6,15: PRINT " "
6990 FOR K = 1000 TO 400 STEP -100
7000 SOUND K,.2,11
7010 L = 100 + K
7020 SOUND L,.2,11,1
7030 NEXT K
7040 NEXT I
7050 COLOR 3: GOSUB 2830
7060 LOCATE 6,15: PRINT "STARBASE 6 - dead ahead."
7070 TL=TIMER: RETURN
7080 IF GO=1 THEN RETURN ELSE GOSUB 6180: RETURN
7090 REM ***** PHASERS *****
7100 GOSUB 5990: LOCATE 5,7: PRINT MZ$ "Energize Phasers.": LOCATE 7,7
7110 IF PD=1 THEN PRINT SR$ PB$ AD$: GOSUB 6150: GOTO 7240
7120 IF PA=1 THEN 7230
7130 IF PR<4 THEN PRINT WR$: GOSUB 6180: GOTO 8650
7140 LINE (118,81)-(133,76),0: LINE (133,76)-(148,81),0: REM FILL PHASER
7150 LINE (118,81)-(133,85),0: LINE (133,85)-(148,81),0: PAINT (125,81),0
7160 FOR I = 1000 TO 10000 STEP 1000: SOUND I,1,10: NEXT I
7170 PR=PR+2: IF PD=1 THEN RETURN
7180 PA=1: PRINT CA$ "- Phasers at FULL power.": GOTO 7240
7190 GOSUB 5990: LOCATE 5,7: PRINT MZ$ "Deactivate Phasers.": IF PA=0 THEN 7230
7200 PAINT (125,81),3,2: PR=PR+2: PA=0
7210 FOR I = 10000 TO 1000 STEP -1000: SOUND I,1,10: NEXT I
7220 LOCATE 7,7: PRINT CA$ "Phasers are deactivated.": GOTO 7240
7230 LOCATE 7,7: PRINT CA$ NA$ RP$: GOSUB 6150
7240 GOSUB 6180: RETURN
7250 REM ***** PHOTON ARM *****
7260 FOR I = 1 TO PT: CIRCLE (I*8+178,82),2.2,2,,,2
7270 PAINT (I*8+178,82),0,2: SOUND 1234,1,9: NEXT I: PO=1
7280 RETURN
7290 REM ***** BLAST *****
7300 QQ=1
7310 GOSUB 5990: X$="B": GOSUB 6040: IF X=1 THEN 7430
7320 IF PD=1 THEN 7420
7330 IF PA=0 THEN 7410
7340 FOR I = 500 TO 5000 STEP 100: SOUND I,.1,15: NEXT I: SOUND 3000,.2,15
7350 LOCATE 5,14: PRINT "*** PHASER - BLAST ***"
7360 FOR I = 1 TO 31 STEP 2: X = 375/(24+I)
7370 FOR J = 500 TO 2500 STEP 500: SOUND J,.1,X: NEXT J
7380 FOR K = 2500 TO 500 STEP -500: SOUND K,.1,X: NEXT K
7390 NEXT I
7400 GOSUB 5060: GOTO 7430
7410 LOCATE 6,4: PRINT CA$ " - Phasers have not been energized.": GOTO 6150
7420 LOCATE 6,4: PRINT CA$ ", " PB$ AD$: GOTO 6150
7430 RETURN
7440 REM ***** LAUNCH *****
7450 GOSUB 5990: X$="L": GOSUB 6040: IF X=1 THEN 7570
7460 IF TD=1 THEN 7560
7470 IF PO=0 THEN 7550
7480 IF PT=0 THEN LOCATE 6,7: PRINT CA$ "- Torpedos are all gone!": GOTO 6150
7490 FOR K=0 TO 15: SOUND K*1000,.2,15: SOUND K*250,.2,15: NEXT K: SOUND 5000,2,15
7500 LOCATE 5,13: PRINT "*** TORPEDO - LAUNCH ***"
7510 PX=PT: GOSUB 7520: GOTO 7530
7520 FOR I = PT TO PX STEP -1: PAINT (I*8+178,82),3: NEXT I: RETURN
7530 FOR I = 15 TO 0 STEP -1: SOUND 7000,.1,I: SOUND 5000,.1,I: NEXT I
7540 PT=PT-1: GOSUB 5060: GOTO 7570
7550 LOCATE 6,6: PRINT CA$ " - Torpedos have not been armed.": GOTO 6150

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7560 LOCATE 6,6: PRINT CAS " , " TT$ AD$: GOTO 6150
7570 RETURN
7580 REM ***** HIT *****
7590 FOR I = 0 TO 15: FOR J = 1000 TO 400 STEP -100: SOUND J, .1, I: NEXT J, I
7600 PLAY "V15MBO4T90B"
7610 GOSUB 6010: LOCATE 5,7: PRINT CAS NAS " ....."
7620 LOCATE 7,7: PRINT "We've been HIT !"
7630 PLAY "T250 V14 MF 06 C16 05 C16 04 C16 03 C16 02 C16 01 C16 00 C16"
7640 FOR J=100 TO 1000 STEP 25:SOUND J, .01, 10:SOUND 1100-J, .01, 10:NEXT J
7650 LOCATE 5,7: PRINT "Standby for Engineering damage report....."
7660 FOR I = 100 TO 5000 STEP 1000:SOUND I, .01, 10: NEXT I
7670 LOCATE 7,7
7680 ON (SH+1) GOTO 7750,7720,7690
7690 SH=1: PAINT (60,80),1,3: PR=PR+2
7700 PRINT "Shields 50% destroyed!"
7710 SD=1: GOTO 8240
7720 SH=0: PAINT (25,80),1,3: PR=PR+2
7730 IF TS>0 THEN PAINT (25,80),2,3
7740 PRINT "All Shields destroyed!": GOTO 7710
7750 L=INT(RND*7)+1: ON L GOTO 7760,7790,7850,7960,7960,7960,7960
7760 IF PA=0 THEN 7750
7770 PA=0: PAINT (125,81),1,3: PR=PR+2: PD=1
7780 PRINT PB$ " are gone!": GOTO 8240
7790 IF PO=0 THEN 7750
7800 IF PT=0 THEN 7750 ELSE LP=PT
7810 PO=0: TD=1
7820 FOR I = 1 TO PT: CIRCLE (I*8+178,82),2.2,1,,,2
7830 PAINT (I*8+178,82),1: SOUND 1234,1,9: NEXT I
7840 PRINT TT$ " are blocked!": GOTO 8240
7850 ON (DY+1) GOTO 7750,7940,7860,7920
7860 DY=1: PAINT (240,127),1,2: PRINT "Secondary" CD$
7870 SOUND 5000,20,15: FOR I = 1 TO 100: NEXT I
7880 IF TC>0 THEN PAINT (240,127),2
7890 LOCATE 5,7: PRINT CAS NAS " , " WE$ " are useless!"
7900 IF SX<2 THEN 8230 ELSE SP=1
7910 GO=1: GOSUB 6700: GO=0: GOTO 8230
7920 DY=2: PAINT (196,127),1,2: PRINT "Primary" CD$
7930 CD=1: GOTO 8230
7940 DY=0: PRINT "Impulse engines have shorted out!": SP=0
7950 SOUND 4000,10,15: GOSUB 6010: GO=1: GOSUB 6770: GO=0: GOTO 8230
7960 L=INT(RND*6)+1: IF SS(L)=1 THEN 7960 ELSE SS(L)=1
7970 YD=1
7980 ON L GOTO 8160,8100,8080,8060,8030,8160
7990 PRINT B$: LOCATE 5,7: PRINT "
8000 LOCATE 5,7: J=L*21: PAINT (5+J,126),1,2: GOSUB 4010
8010 FOR I = 10 TO 1 STEP -1: SOUND 1000*I,1,15: NEXT I
8020 RETURN
8030 B$ = SR$ + CM$ + AD$: GOSUB 7990
8040 PRINT "Generator readings have malfunctioned."
8050 LOCATE 10,31: PRINT "???": GOTO 8240
8060 B$ = SR$ + LS$ + AD$: GOSUB 7990
8070 PRINT "Target vector data unavailable.": GOSUB 4810: GOTO 8240
8080 B$ = SR$ + TS$ + AD$: GOSUB 7990
8090 PRINT "Weapons accuracy is reduced!": GOTO 8240
8100 B$ = SR$ + LF$ + AD$: GOSUB 7990
8110 PRINT "Remaining oxygen ** 10 seconds **": FOR I = 1 TO 15
8120 LOCATE 5,27: PRINT " ": FOR J = 2500 TO 5000 STEP 250
8130 SOUND J, .1, 11: NEXT J: LOCATE 5,27: PRINT " 10"
8140 FOR J = 2500 TO 1000 STEP -250: SOUND J, .1, 11: NEXT J: NEXT I
8150 TL=TIMER: GOTO 8240
8160 IF SS(1)=1 AND SS(6)=1 THEN 8220
8170 B$ = SR$ + HL$ + AD$: L=1: GOSUB 7990
8180 PRINT "Outer hull is near collapse !!!": LOCATE 7,7
8190 PRINT ">>> We can't sustain another hit <<<": FOR I = 1 TO 2
8200 FOR J = 10 TO 40 STEP 2: SOUND 1500, .03, 12: LOCATE 6, J: PRINT "**"
8210 LOCATE 6, J: PRINT " ": NEXT J: NEXT I: GOTO 8240
8220 SOUND OFF: SOUND ON: Z$="** Enterprise Is Collapsing **": GOTO 4170
8230 PR=PR-CDPR
8240 REM
8250 FOR I = 15 TO 1 STEP -1: SOUND 3000, .4, I: SOUND 1000, .3, I: NEXT I
8260 GOSUB 6180: RETURN
8270 REM ***** REPAIR START *****
8280 GOSUB 5990: LOCATE 5,7: PRINT "Engineering...Repair " A$: LOCATE 7,7
8290 BAD=0: IF PR<10 THEN GOSUB 8590: BAD=1

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8300 RETURN
8310 A$="those Shields!": GOSUB 8280: IF BAD=1 THEN RETURN
8320 IF SD=0 THEN 8620
8330 IF TS>0 THEN 8600 ELSE TS=TIMER
8340 PAINT (60,80),2,3
8350 IF SH=0 THEN PAINT (25,80),2,3
8360 GOTO 8660
8370 A$="our Weapons!": GOSUB 8280: IF BAD=1 THEN RETURN
8380 IF PD=0 AND TD=0 THEN 8620
8390 IF PD=0 THEN 8420
8400 IF PD=1 AND TP=0 THEN TP=TIMER: PAINT (125,81),2,3: GOTO 8660
8410 IF TD=0 THEN 8600
8420 IF TT>0 THEN 8600 ELSE TT=TIMER
8430 FOR I = 1 TO PT: CIRCLE (I*8+178,82),2.2,2,...,2
8440 PAINT (I*8+178,82),2: SOUND 1234,1,9: NEXT I: GOTO 8660
8450 A$="the Crystals!": GOSUB 8280: IF BAD=1 THEN RETURN
8460 IF CD=0 THEN 8620
8470 IF TC>0 THEN 8600 ELSE TC=TIMER
8480 PAINT (196,127),2,3
8490 IF DY=1 THEN PAINT (240,127),2,3
8500 GOTO 8660
8510 A$="Ergosystems!": GOSUB 8280: IF BAD=1 THEN RETURN
8520 IF YD=0 THEN 8620
8530 IF SS(6)=1 THEN SS(1)=1
8540 X=0: FOR I = 1 TO 5: IF SS(I)=1 THEN 8550 ELSE 8560
8550 IF TE(I)>0 THEN 8560 ELSE TE(I)=TIMER: X=1: PAINT (5+I*21,126),2: GOTO 8660
8560 NEXT I: IF SS(6)=0 THEN 8580
8570 IF TE(1)>0 THEN 8580 ELSE TE(1)=TIMER: X=1
8580 IF X=0 THEN 8600 ELSE 8660
8590 PRINT WR$: GOSUB 6150: GOTO 8650
8600 PRINT "Work party already dispatched - Sir."
8610 FOR I = 1 TO 10: SOUND 400+I*20,1,(5+I): NEXT I: RETURN
8620 PRINT "But Sir, Ship monitors read normal!"
8630 FOR I = 1000 TO 700 STEP -100: SOUND I,1,11: NEXT I
8640 FOR I = 1 TO 3: SOUND 1200,2,11: NEXT I
8650 SOUND 2000,10,10: RETURN
8660 LOCATE 7,7: PRINT "Yes Sir, We're on our way!"
8670 PLAY "MBV10L16T25504C.FGEDC+FFG-CEA."
8680 IF PLAY (0) = 0 GOTO 8700
8690 GOTO 8680
8700 PR=PR-2: GOSUB 6180: RETURN
8710 REM ***** FIX *****
8720 X=TIMER-EE
8730 IF TE(2)>0 THEN 8800
8740 IF TS>0 THEN 8830
8750 IF TE(1)>0 THEN 8850
8760 IF TT>0 THEN 8880
8770 IF TP>0 THEN 8920
8780 IF TC>0 THEN 8950
8790 FOR I = 3 TO 5: IF TE(I)>0 THEN 8980 ELSE NEXT I: RETURN
8800 IF (TE(2)+12)>TIMER THEN 8740 ELSE TE(2)=0: SS(2)=0
8810 FOR I = 1 TO 6: IF SS(I)=1 THEN 8820 ELSE NEXT I: YD=0
8820 A$=LFS: I=2: GOSUB 9060: GOTO 9100
8830 IF X<(TS+70) THEN 8750 ELSE TS=0: GOSUB 5880: SD=0
8840 A$="All Shields": GOTO 9100
8850 IF X<TE(1) THEN 8760 ELSE TE(1)=0: SS(1)=0: SS(6)=0
8860 FOR I = 1 TO 6: IF SS(I)=1 THEN 8870 ELSE NEXT I: YD=0
8870 A$=HLS: I=1: GOSUB 9060: GOTO 9100
8880 IF X<(TT+5) THEN 8770 ELSE TT=0: PT=LP: TD=0
8890 FOR I = 1 TO PT: PAINT (I*8+178,82),3: NEXT I
8900 GOSUB 7250: TD=0
8910 A$=TTS: GOTO 9100
8920 IF X<(TP+10) THEN 8780 ELSE TP=0: GOSUB 7140: PD=0
8930 PA=1
8940 A$=PBS: GOTO 9100
8950 IF X<TC THEN 8790 ELSE TC=0: CD=0
8960 PAINT (196,127),3: PAINT (240,127),3: PR=PR+CDPR*(3-DY): DY=3
8970 GOSUB 4050: GOSUB 4080: A$="Ship's Engines": GOTO 9100
8980 FOR K = 1 TO 5: IF X<TE(K) OR TE(K)=0 THEN NEXT K ELSE 9000
8990 RETURN
9000 I=K: TE(I)=0: SS(I)=0: J=I: GOSUB 9060
9010 FOR K = 1 TO 6: IF SS(K)=1 THEN 9020 ELSE NEXT K: YD=0
9020 ON (J-2) GOTO 9030,9040,9050
9030 A$=TSS: GOTO 9100

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9040 AS=LS$: GOTO 9100
9050 AS=CMS: GOTO 9100
9060 J=I*21: PAINT (5+J,126),3: SOUND 750,10,10
9070 LINE (11+J,120)-(20+J,126),2: LINE (20+J,126)-(11+J,133),2
9080 LINE (11+J,133)-(2+J,126),2: LINE (2+J,126)-(11+J,120),2
9090 PAINT (5+J,126),0,2: RETURN
9100 GOSUB 6010: LOCATE 6,7: PRINT "Scotty here, " AS " are fixed."
9110 FOR I = 1 TO 10: SOUND 1000,1,10: SOUND 700,1,10: NEXT I
9120 PR=PR+2: GOSUB 6180: RETURN
9130 REM ***** WIN / LOOSE *****
9140 SCREEN 0: COLOR ,1,4: CLS: COLOR 28,8: SOUND ON: PLAY "L4MN": LOCATE 2,35
9150 IF KP=0 THEN WL=1 ELSE WL=0
9160 TIME = TIMER - TIMEX
9170 RATE = INT(WL*1000+ZAP*20-TIME-300*HYPER-200*TORMIS-MISS*75+10*PR-20*KP)
9180 IF WL=0 THEN 9200
9190 PRINT " YOU WIN ! ": PLAY "T250MF03V13 C8E8G804G8P803G804T50C.": GOTO 9210
9200 PRINT " YOU LOSE ": PLAY "T175MF01V12 G.G.G16GFE-DC."
9210 COLOR 11,1: LOCATE 3,35: PRINT " _____ "
9220 LOCATE 6,15:IF WL=0 THEN 9240
9230 PRINT "Congratulations " CAS NAS " -: GOTO 9250
9240 PRINT CAS NAS ", your tribunal has convened -"
9250 FOR I = 1 TO 50: SOUND I*100,5,10: NEXT I
9260 LOCATE 8,15:PRINT "Standby for your Efficiency Rating : "
9270 FOR I = 10 TO 1 STEP -1: SOUND 1000*I,5,11: SOUND 1500*I,5,12: NEXT I
9280 COLOR 14,8:LOCATE 10,30: PRINT ">>> " RATE " <<<": COLOR 13,1
9290 IF WL=0 THEN 9360
9300 LOCATE 12,10:IF RATE < 300 THEN 9330 ELSE IF RATE < 1 THEN 9370
9310 PRINT "If you continue this outstanding performance,": LOCATE 13,10
9320 PRINT "the Federation will surely promote you to Admiral !": GOTO 9410
9330 PRINT "The Federation reviewed this mission and recommends": LOCATE 13,10
9340 PRINT "that you increase your life insurance before the next mission."
9350 GOTO 9410
9360 LOCATE 12,10:IF RATE < -499 THEN 9390
9370 PRINT "Starfleet Command has notified all Federation agencies":LOCATE 13,10
9380 PRINT "that you are hereby on probation until further notice.": GOTO 9410

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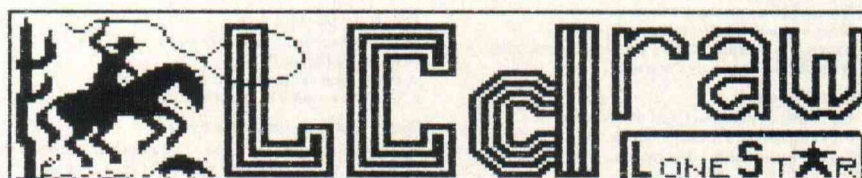

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9390 PRINT "Starfleet Command is now reviewing all your records": LOCATE 13,10
9400 PRINT "to consider a full Federation Courts Martial."
9410 COLOR 1,4:LOCATE 15,1:FOR I = 1 TO 160: PRINT CHR$(176);:NEXT I:COLOR 10,1
9420 FOR I = 1 TO 300: NEXT I
9430 PLAY "T255L8MF02V10 CEDFEFGAGBABA32G32F32E32D32C.L4"
9440 LOCATE 18,10: IF WL=0 THEN 9460
9450 PRINT "Mr. Spock wants to know if you wish to ...": GOTO 9470
9460 PRINT "Meanwhile, Mr Spock recommends that you either ..."
9470 IF EN$ = " KHAN'S" THEN EN$ = "Mad KHAN"
9480 LOCATE 20,13: IF WL=0 THEN 9500
9490 PRINT "... 1 - Take on another " EN$ " ,": GOTO 9510
9500 PRINT "... 1 - Risk challenging another " EN$ " ,"
9510 IF EN$ = "Mad KHAN" THEN EN$ = " KHAN'S"
9520 LOCATE 21,13: IF WL=0 THEN 9550
9530 PRINT "      2 - Return to Starfleet Command for your Staff Meeting [menu]"
9540 GOTO 9560
9550 PRINT "      2 - Return to Starfleet Command for more combat training [menu]"
9560 LOCATE 22,13: IF WL=0 THEN 9590
9570 PRINT "      3 - Or, beam down to Earth for your annual vacation [exit] ?"
9580 GOTO 9600
9590 PRINT "      3 - Or, accept a temporary relief of Command [exit] ."
9600 AS$ = "": AS$ = INKEY$: IF AS$ = "" THEN 9600
9610 IF AS$ = CHR$(49) THEN 2750
9620 IF AS$ = CHR$(50) THEN 130
9630 IF AS$ = CHR$(51) THEN SYSTEM
9640 GOTO 9600
9650 REM ***** TITLE DATA *****
9660 DATA 9,10,6,32,6,52,8,69,15,46,12,37,15,48,12,61,6,18,3,27,5,46,6,61
9670 DATA 12,14,12,31,14,43,17,61,5,10,3,32,7,48,3,65,12,15,15,29,18,47
9680 DATA 14,66,3,14,4,32,7,52,9,61,12,19,12,27,15,45,17,69,6,13,7,46
9690 DATA 6,69,16,33,12,52,12,70,9,18,9,43,4,71,18,27,18,54,15,62,9,14,3,48
9700 DATA 6,64,17,35,12,45,15,64,7,20,3,35,6,45,6,66,18,15,13,37,12,49
9710 DATA 13,69,6,15,4,50,3,61,15,36,18,43,14,61,3,11,8,61,15,32,15,47,13,68
9720 DATA 3,18,7,67,14,27,18,51,16,66,6,20,7,45,3,68,12,34,18,49,15,65,6,11
9730 DATA 9,54,7,66,15,34,12,43,13,61,9,16,9,32,5,51,9,70,16,27,12,47,16,67
9740 DATA 9,20,8,54,3,63,18,37,18,45,18,70,3,16,8,43,5,71,14,15,14,37,12,54
9750 DATA 18,61,9,12,7,32,4,47,6,62,15,31,16,43,12,71,6,17,7,44,3,70,12,29
9760 DATA 15,43,17,68,9,19,3,29,3,37,8,68,12,10,15,37,18,53,18,71,3,15,7,51
9770 DATA 6,71,17,15,12,36,12,51,3,10,17,43,9,11,3,33,7,49,6,67,12,20,17,34
9780 DATA 13,43,16,61,6,14,8,32,3,66,12,17,12,48,3,12,3,67,12,33,18,48,9,15
9790 DATA 6,63,15,35,12,50,6,19,6,70,12,32,18,46,6,16,5,61,13,27,18,52,9,13
9800 DATA 3,36,6,68,12,11,17,27,15,47,3,20,15,27,18,50,6,10,3,28,6,64,12,18
9810 DATA 15,33,12,46,15,61,6,12,3,31,7,53,4,61,12,31,15,30,3,13,3,69,9,17
9820 DATA 3,30,7,50,3,64,12,16,12,35,15,44,14,67,3,17,5,32,7,61,15,15,12,28
9830 DATA 18,44,4,10,9,71,13,15,15,28,12,53,3,19,7,47,3,62,18,36,12,44,8,20
9840 DATA 3,34,3,71,12,12,12,30,15,63,16,32,12,13,16,15,6,65,3,49
9850 END

```

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The *Metric Calculator* supports 36 metric-to-English and English-to-metric conversions in six categories. The entire program is menu driven and selections are made with one keystroke. Once a specific conversion is selected, it can be repeated over and over until the letter X is entered instead of a value. Pressing the ESC key at any menu returns to the main menu and will abort the program from the main menu.

Printed results can be supported by adding this line in the Main Program segment (see documentation in the program listing):

```
WriteLn(1st,'
',UserVar:5:5,OrigId,' =
',Answer:5:5,ConId);
```

Note the operation values (OpVAL) for the temperature conversions are actually flags that trigger the use of specific formulas. All of the other OpVals are used as a factor in a simple multiplication formula (see the DoTheCalculation procedure). The value assigned to the While...do statement in the main program segment can never be entered by the user, this forces the

Bob Mills is a Master Sergeant in the United States Air Force working at Walter Reed Army Medical Center, Washington, D.C. He has written numerous programs for his USAF duty sections and is the president of MS-AGES, a Frederick, Maryland user's group.

Metric Calculator

By Bob Mills



loop to continue until the user enters the letter X instead of a value. The program listing is complete, no special include files or compiler directives are required.

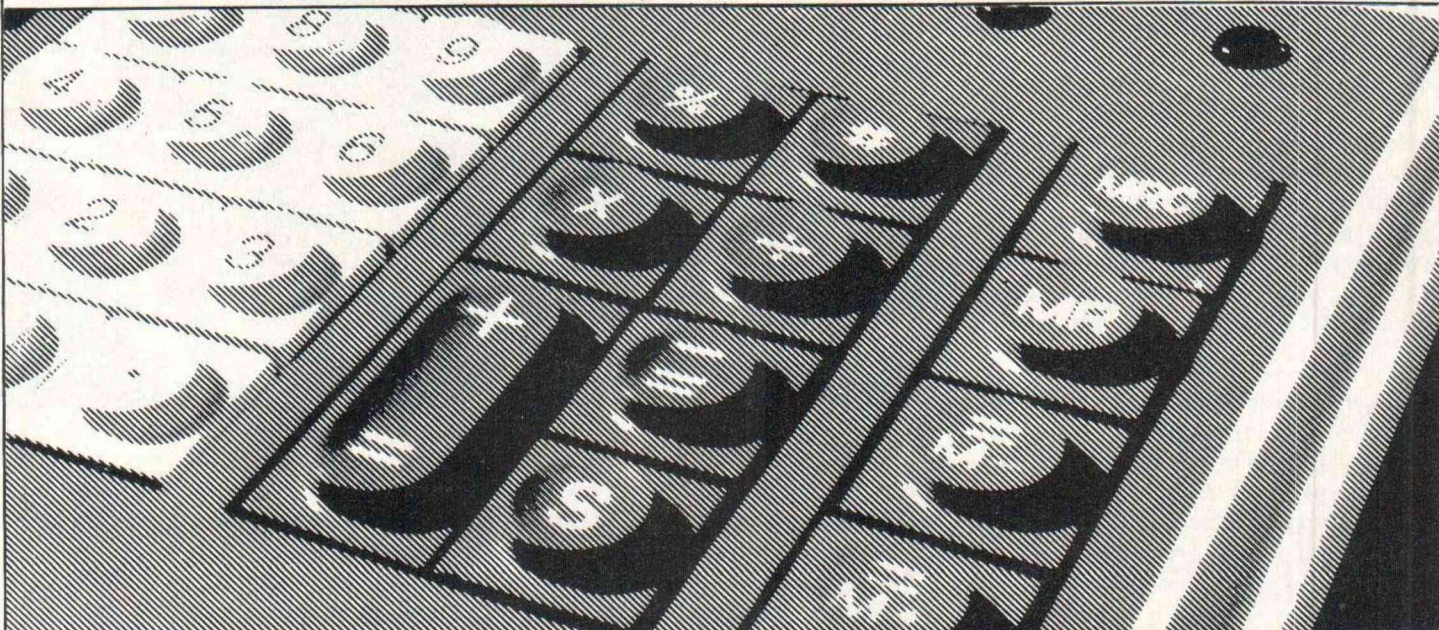
The remarks in braces are for clarity only, you don't need to type them in for

the program to run.

If you have any questions, drop me a line at 300 Heather Ridge Drive, Frederick, MD 21701. The program is also on this month's PCM ON DISK. My handle on Delphi is BOBMILLS. □

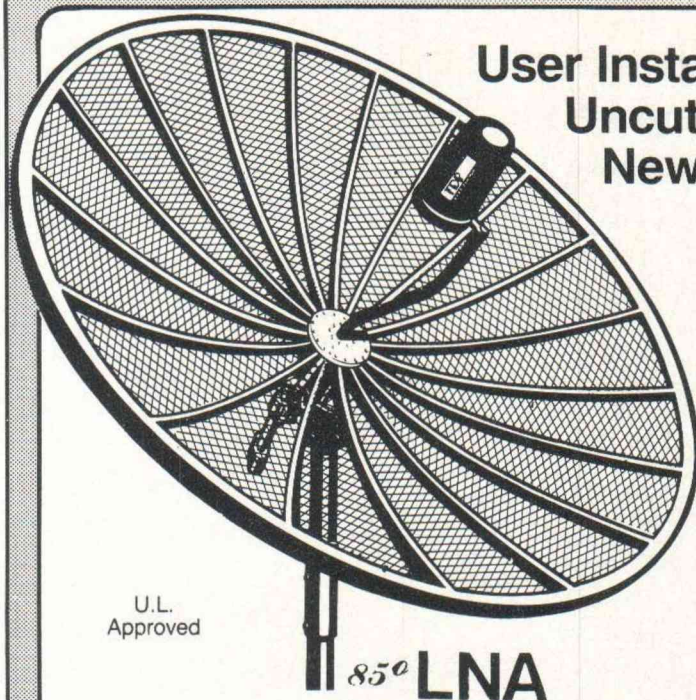
The listing:

```
(*****  
METRIC CALCULATOR  
By: Bob Mills  
Copyright 1986  
*****)  
  
program MetricCalculator;  
  
(***) DEFINE GLOBAL VARIABLES HERE ***)  
  
type  
Titles=string[40];  
  
var  
Choice,ch:char;  
OpVal, Answer, UserVar:real;  
ColorFlag:boolean;  
OrigId, ConId, TitleId:Titles;  
CalcCode,x,y:integer;  
UserString:string[20];  
  
label PopToHere;  
  
( Set up for Color or Black and White Monitors )  
procedure ColorYesNo(var ColorFlag:boolean);  
  
begin  
  ClrScr;  
  TextMode(bw40);  
  gotoXY(1,12);  
  Writeln('Are You Using A Color Monitor Y or N ?');  
  repeat  
    read(kbd,ch);  
    ch:=UpCase(ch);  
  until ch in ['Y','N'];  
  Case ch of  
    'Y' : begin  
      ColorFlag:=true;          (Bright White on Blue)  
      TextMode(c80);TextColor(15);TextBackground(1);  
      end;  
    'N' : begin  
      ColorFlag:=false;        (Light Gray on Black)  
      TextMode(bw80);TextColor(7);TextBackground(0);  
      end;  
  end; (Case)  
end; {Procedure ColorYesNo}
```



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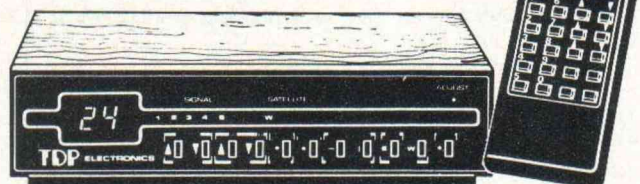
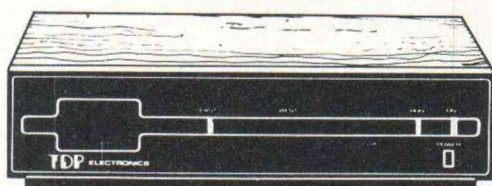
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```

procedure NormColor; { Return to normal colors }
begin
  if ColorFlag THEN begin
    TextBackground(1);TextColor(15); { Bright White on Blue }
  end else begin
    TextBackground(0);TextColor(7); { Light gray on Black }
  end;
end; { procedure }

procedure HighColor; { Set colors for highlights }
begin
  if ColorFlag then begin
    TextBackground(4);TextColor(15); { Bright White on Red }
  end else begin
    TextBackground(0);TextColor(15); { Bright White on Black }
  end;
end; { procedure }

procedure RevColor; { Set colors for Reverse Video }
begin
  if ColorFlag then begin
    TextBackground(15);TextColor(1); { Blue on Bright White }
  end else begin
    TextBackground(15);TextColor(0); { Black on Bright White }
  end;
end; { procedure }

{ Wait for a key to be pressed and then proceed }
procedure TapAKey;

begin
  ch:=chr(1); {set ch to nonkeyboard character}
  repeat;
  read(kbd,ch);
  until ch <> chr(1);
end; { TapAKey }

{ Abort program execution }
procedure Stop;
begin
  ClrScr;
  TextMode(bw80);
  gotoXY(1,12);
  Writeln('Program execution has been aborted. ');
  Writeln('Thank You for using the Metric Calculator ! Bob Mills.... ');
  Halt;
end; { Stop procedure }

procedure TitleScreen;
begin
  ClrScr;
  gotoXY(28,3);HighColor;
  write('*****');gotoXY(28,4);
  write(' METRIC CONVERSIONS ');gotoXY(28,5);
  write('*****');NormColor;

  gotoXY(30,7);write('Version 1.00.00');
  gotoXY(36,10);write('By:');
  gotoXY(33,12);write('Bob Mills');
  gotoXY(26,15);write('300 Heather Ridge Drive');
  gotoXY(28,16);write('Frederick, MD 21701');
  gotoXY(32,17);write('301-695-5228');
  gotoXY(21,21);write(' <<< *****--+-***** >>> ');
  gotoXY(3,24);RevColor;write('Press any key ->');NormColor;
  TapAKey;
end; {of procedure}

{ MENU FOR LENGTH CALCULATIONS }
procedure LengthCalc(var CalcCode:integer;var ch:char);
begin

```




```

ch:=chr(1);TitleId:=' LENGTH ';
clrscr; HighColor;
gotoXY(5,1);write(' <<< LENGTH CONVERSIONS: >>> '); NormColor;
gotoXY(20,6);write(' A = CENTIMETERS to INCHES');
gotoXY(20,8);write(' B = INCHES to CENTIMETERS');
gotoXY(20,10);write(' C = METERS to FEET');
gotoXY(20,12);write(' D = FEET to METERS');
gotoXY(20,14);write(' E = YARDS to METERS');
gotoXY(20,16);write(' F = METERS to YARDS');
gotoXY(20,18);write(' G = KILOMETERS to MILES');
gotoXY(20,20);write(' H = MILES to KILOMETERS');
repeat
  gotoXY(10,23);RevColor;
  write(' --> Which conversion would you like to do ? ');
  NormColor;
  read(kbd,ch); ch := UpCase(ch);
  until ch in ['A'..'H',CHR(27)];
Case ch of
'A' : CalcCode:=1;
'B' : CalcCode:=2;
'C' : CalcCode:=3;
'D' : CalcCode:=4;
'E' : CalcCode:=5;
'F' : CalcCode:=6;
'G' : CalcCode:=7;
'H' : CalcCode:=8;
end { of Case };
end; { of procedure }

```

```

{ MENU FOR AREA CALCULATIONS }
procedure AreaCalc(var CalcCode:integer;var ch:char);
begin
  ch:=chr(1);TitleId:=' AREA ';
  clrscr; HighColor;
  gotoXY(5,1);write(' <<< AREA CONVERSIONS: >>> '); NormColor;
  gotoXY(17,6);write(' A = SQ. CENTIMETERS to SQ. INCHES');
  gotoXY(17,8);write(' B = SQ. INCHES to SQ. CENTIMETERS');
  gotoXY(17,10);write(' C = SQ. METERS to SQ. FEET');
  gotoXY(17,12);write(' D = SQ. FEET to SQ. METERS');
  gotoXY(17,14);write(' E = SQ. METERS to SQ. YARDS');
  gotoXY(17,16);write(' F = SQ. YARDS to SQ. METERS');
  gotoXY(17,18);write(' G = SQ. KILOMETERS to SQ. MILES');
  gotoXY(17,20);write(' H = SQ. MILES to SQ. KILOMETERS');
  repeat
    gotoXY(10,23);RevColor;
    write(' --> Which conversion would you like to do ? ');
    NormColor;
    read(kbd,ch); ch := UpCase(ch);
    until ch in ['A'..'H',CHR(27)];
  Case ch of
  'A' : CalcCode:=9;
  'B' : CalcCode:=10;
  'C' : CalcCode:=11;
  'D' : CalcCode:=12;
  'E' : CalcCode:=13;
  'F' : CalcCode:=14;
  'G' : CalcCode:=15;
  'H' : CalcCode:=16;
  end { of Case };
end; { of procedure }

```

```

{ MENU FOR VOLUME CALCULATIONS }
procedure VolumeCalc(var CalcCode:integer;var ch:char);
begin
  ch:=chr(1);TitleId:=' VOLUME ';
  clrscr; HighColor;
  gotoXY(5,1);write(' <<< VOLUME CONVERSIONS: >>> '); NormColor;
  gotoXY(17,6);write(' A = CU. CENTIMETERS to CU. INCHES');
  gotoXY(17,8);write(' B = CU. INCHES to CU. CENTIMETERS');
  gotoXY(17,10);write(' C = CU. METERS to CU. FEET');
  gotoXY(17,12);write(' D = CU. FEET to CU. METERS');
  gotoXY(17,14);write(' E = CU. METERS to CU. YARDS');

```



```

gotoXY(17,16);write(' F = CU. YARDS to CU. METERS');
repeat
  gotoXY(10,23);RevColor;
  write(' --> Which conversion would you like to do ? ');
  NormColor;
  read(kbd,ch); ch := UpCase(ch);
  until ch in ['A'..'F',CHR(27)];
Case ch of
'A' : CalcCode:=17;
'B' : CalcCode:=18;
'C' : CalcCode:=19;
'D' : CalcCode:=20;
'E' : CalcCode:=21;
'F' : CalcCode:=22;
end ( of Case );
end; ( of procedure )

( MENU FOR CAPACITY CALCULATIONS )
procedure CapacityCalc(var CalcCode:integer;var ch:char);
begin
  ch:=chr(1);TitleId:=' CAPACITY ';
  clrscr; HighColor;
  gotoXY(5,1);write(' <<< CAPACITY CONVERSIONS: >>> '); NormColor;
  gotoXY(17,6);write(' A = MILLILITERS to OUNCES [U.S. Liquid]');
  gotoXY(17,8);write(' B = OUNCES [U.S. Liquid] to MILLILITERS');
  gotoXY(17,10);write(' C = LITERS to QUARTS [U.S. Liquid]');
  gotoXY(17,12);write(' D = QUARTS [U.S. Liquid] to LITERS');
  gotoXY(17,14);write(' E = LITERS to GALLONS [U.S. Liquid]');
  gotoXY(17,16);write(' F = GALLONS [U.S. Liquid] to LITERS');
  repeat
    gotoXY(10,23);RevColor;
    write(' --> Which conversion would you like to do ? ');
    NormColor;
    read(kbd,ch); ch := UpCase(ch);
    until ch in ['A'..'F',CHR(27)];
  Case ch of
'A' : CalcCode:=23;
'B' : CalcCode:=24;
'C' : CalcCode:=25;
'D' : CalcCode:=26;
'E' : CalcCode:=27;
'F' : CalcCode:=28;
end ( of Case );
end; ( of procedure )

( MENU FOR MASS CALCULATIONS )
procedure MassCalc(var CalcCode:integer;var ch:char);
begin
  ch:=chr(1);TitleId:=' MASS ';
  clrscr; HighColor;
  gotoXY(5,1);write(' <<< MASS CONVERSIONS: >>> '); NormColor;
  gotoXY(17,6);write(' A = GRAMS to OUNCES [Avoirdupois]');
  gotoXY(17,8);write(' B = OUNCES [Avoirdupois] to GRAMS');
  gotoXY(17,10);write(' C = GRAMS to OUNCES [Troy]');
  gotoXY(17,12);write(' D = OUNCES [Troy] to GRAMS');
  gotoXY(17,14);write(' E = KILOGRAMS to POUNDS [Avoirdupois]');
  gotoXY(17,16);write(' F = POUNDS [Avoirdupois] to KILOGRAMS');
  repeat
    gotoXY(10,23);RevColor;
    write(' --> Which conversion would you like to do ? ');
    NormColor;
    read(kbd,ch); ch := UpCase(ch);
    until ch in ['A'..'F',CHR(27)];
  Case ch of
'A' : CalcCode:=29;
'B' : CalcCode:=30;
'C' : CalcCode:=31;
'D' : CalcCode:=32;
'E' : CalcCode:=33;
'F' : CalcCode:=34;
end ( of Case );

```

S


```

end; ( of procedure )

( MENU FOR TEMPERATURE CALCULATIONS )
procedure TempCalc(var CalcCode:integer;var ch:char);
begin
  ch:=chr(1);TitleId:=' TEMPERATURE ';
  clrscr; HighColor;
  gotoXY(5,1);write(' <<< TEMPERATURE CONVERSIONS: >>> '); NormColor;
  gotoXY(17,12);write(' A = CENTIGRADE to FAHRENHEIT');
  gotoXY(17,14);write(' B = FAHRENHEIT to CENTIGRADE');
  repeat
    gotoXY(10,23);RevColor;
    write(' --> Which conversion would you like to do ? ');
    NormColor;
    read(kbd,ch); ch := UpCase(ch);
    until ch in ['A','B',CHR(27) ];
  Case ch of
    'A' : CalcCode:=35;
    'B' : CalcCode:=36;
  end ( of Case );
end; ( of procedure )

```

```

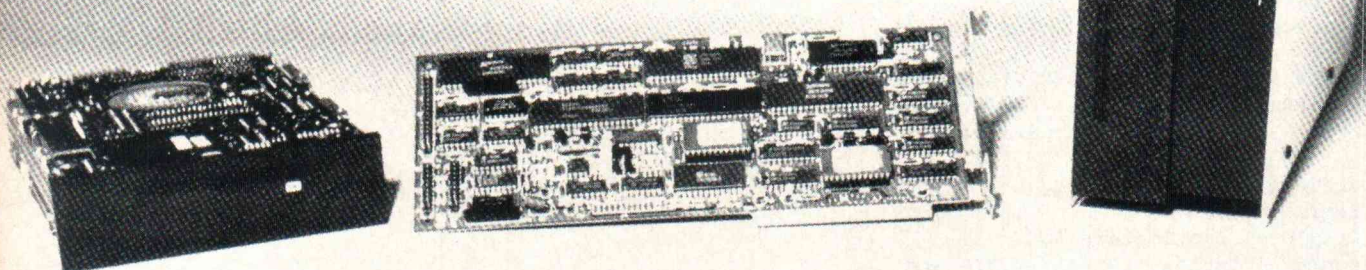
( GET STRINGS AND VALUES FOR SELECTED OPERATION )
procedure GetParams(var OrigId, ConId:Titles;
                    var OpVal : Real);
begin
  Case CalcCode of
    1 : begin
        OrigId:=' Centimeters ';
        ConId:=' Inches ';OpVal:=0.394;end;
    2 : begin
        OrigId:=' Inches ';
        ConId:=' Centimeters ';OpVal:=2.54;end;
    3 : begin
        OrigId:=' Meters ';
        ConId:=' Feet ';OpVal:=3.2808;end;
    4 : begin
        OrigId:=' Feet ';
        ConId:=' Meters ';OpVal:=0.305;end;
    5 : begin
        OrigId:=' Meters ';
        ConId:=' Yards ';OpVal:= 1.0936;end;
    6 : begin
        OrigId:=' Yards ';
        ConId:=' Meters ';OpVal:=0.9144;end;
    7 : begin
        OrigId:=' Kilometers ';
        ConId:=' Miles ';OpVal:=0.62137;end;
    8 : begin
        OrigId:=' Miles ';
        ConId:=' Kilometers ';OpVal:=1.60935;end;
    9 : begin
        OrigId:=' Sq. Centimeters ';
        ConId:=' Sq. Inches ';OpVal:=0.155;end;
    10 : begin
        OrigId:=' Sq. Inches ';
        ConId:=' Sq. Centimeters ';OpVal:=6.452;end;
    11 : begin
        OrigId:=' Sq. Meters ';
        ConId:=' Sq. Feet ';OpVal:=10.764;end;
    12 : begin
        OrigId:=' Sq. Feet ';
        ConId:=' Sq. Meters ';OpVal:=0.0929;end;
    13 : begin
        OrigId:=' Sq. Meters ';
        ConId:=' Sq. Yards ';OpVal:=1.196;end;
    14 : begin
        OrigId:=' Sq. Yards ';
        ConId:=' Sq. Meters ';OpVal:=0.8361;end;
    15 : begin
        OrigId:=' Sq. Kilometers ';
        ConId:=' Sq. Miles ';OpVal:=0.3861;end;
    16 : begin

```



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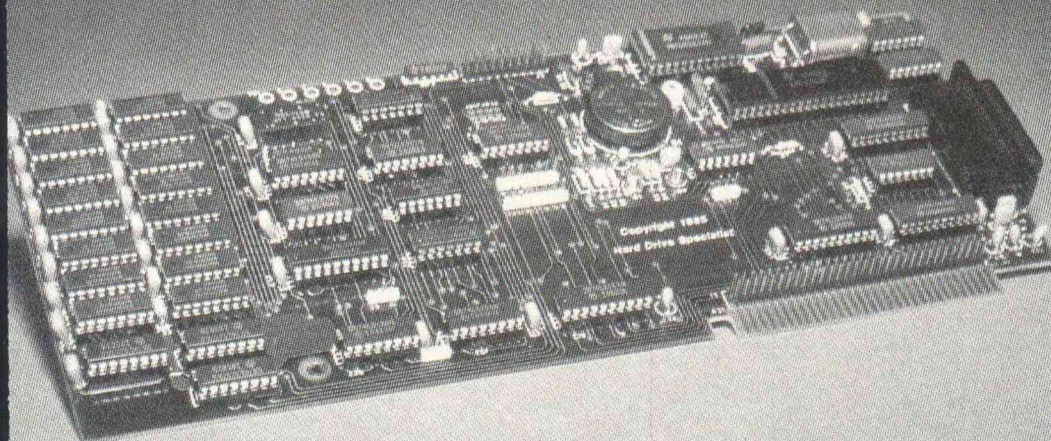
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```

OrigId:=' Sq. Miles ';
ConId:=' Sq. Kilometers ';OpVal:=2.590;end;
17 : begin
OrigId:=' Cu. Centimeters ';
ConId:=' Cu. Inches ';OpVal:=0.0610;end;
18 : begin
OrigId:=' Cu. Inches ';
ConId:=' Cu. Centimeters ';OpVal:=16.3872;end;
19 : begin
OrigId:=' Cu. Meters ';
ConId:=' Cu. Feet ';OpVal:=35.314;end;
20 : begin
OrigId:=' Cu. Feet ';
ConId:=' Cu. Meters ';OpVal:=0.02832;end;
21 : begin
OrigId:=' Cu. Meters ';
ConId:=' Cu. Yards ';OpVal:=1.3079;end;
22 : begin
OrigId:=' Cu. Yards ';
ConId:=' Cu. Meters ';OpVal:=0.7646;end;
23 : begin
OrigId:=' Milliliters ';
ConId:=' Ounces [U.S. Liquid] ';OpVal:=0.03382;end;
24 : begin
OrigId:=' Ounces [U.S. Liquid] ';
ConId:=' Milliliters ';OpVal:=29.573;end;
25 : begin
OrigId:=' Liters ';
ConId:=' Quarts [U.S. Liquid] ';OpVal:=1.05671;end;
26 : begin
OrigId:=' Quarts [U.S. Liquid] ';
ConId:=' Liters ';OpVal:=0.94633;end;
27 : begin
OrigId:=' Liters ';
ConId:=' Gallons [U.S. Liquid] ';OpVal:=0.26418;end;
28 : begin
OrigId:=' Gallons [U.S. Liquid] ';
ConId:=' Liters ';OpVal:=3.78533;end;
29 : begin
OrigId:=' Grams ';
ConId:=' Ounces [Avoirdupois] ';OpVal:=0.03527;end;
30 : begin
OrigId:=' Ounces [Avoirdupois] ';
ConId:=' Grams ';OpVal:=28.3495;end;
31 : begin
OrigId:=' Grams ';
ConId:=' Ounces [Troy] ';OpVal:=0.03215;end;
32 : begin
OrigId:=' Ounces [Troy] ';
ConId:=' Grams ';OpVal:=31.10348;end;
33 : begin
OrigId:=' Kilograms ';
ConId:=' Pounds [Avoirdupois] ';OpVal:=2.20462;end;
34 : begin
OrigId:=' Pounds [Avoirdupois] ';
ConId:=' Kilograms ';OpVal:=0.45359;end;
35 : begin
OrigId:=' Degrees Centigrade ';
ConId:=' Degrees Fahrenheit ';OpVal:=1111.0;end;
36 : begin
OrigId:=' Degrees Fahrenheit ';
ConId:=' Degrees Centigrade ';OpVal:=2222.0;end;
end (of Case);
end; (of Procedure)

```

```

( MAIN SELECTION MENU )

```

```

procedure MainMenu(var Choice:char;var TitleId:Titles);

```

```

begin
ch:=chr(1);
clrscr; HighColor;
gotoXY(25,3);write(' <<< MAIN CONVERSIONS MENU: >>> '); NormColor;

```



```

gotoXY(30,6);write(' A = LENGTH ');
gotoXY(30,8);write(' B = AREA ');
gotoXY(30,10);write(' C = VOLUME ');
gotoXY(30,12);write(' D = CAPACITY ');
gotoXY(30,14);write(' E = MASS ');
gotoXY(30,16);write(' F = TEMPERATURE ');
gotoXY(2,21);write('Press [ESC] at any menu to abort !');
repeat
  gotoXY(10,23);RevColor;
  write(' --> Which Menu do you want to see ? ');
  NormColor;
  read(kbd,ch); ch := UpCase(ch);
  until ch in ['A'..'F',CHR(27) ];
  if ch = chr(27) then Stop else Choice:=ch;

end; { of procedure }

( CALCULATIONS ARE PERFORMED HERE )
procedure DoTheCalculation(var Answer:real);
begin
  if OpVal=2222.0 then begin      { F to C CONVERSION }
    Answer:=(5*(UserVar-32))/9;
  end else if OpVal=1111.0 then begin { C to F CONVERSION }
    Answer:=((UserVar*9)/5)+32;
  end else begin
    Answer:=UserVar*OpVal;end;      { ALL OTHER CONVERSIONS }
end;

(***** Main Program *****)
begin
  ColorYesNo(ColorFlag);
  TitleScreen;
  PopToHere;
  MainMenu(Choice,TitleId);
  Case Choice of
    'A' : LengthCalc(CalcCode,ch);
    'B' : AreaCalc(CalcCode,ch);
    'C' : VolumeCalc(CalcCode,ch);
    'D' : CapacityCalc(CalcCode,ch);
    'E' : MassCalc(CalcCode,ch);
    'F' : TempCalc(CalcCode,ch);
  end { of Case };
  if ch=chr(27) then goto PopToHere;
  GetParams(OrigId,ConId,OpVal);
  UserVar:=1;ch:=chr(1);
  ClrScr;
  HighColor;gotoXY(15,5);write(' <<< ',TitleId,' >>> ');
  NormColor;
  gotoXY(5,8);write('To exit this area enter the letter X .');
  gotoXY(5,9);write('Valid values are -1000 thru 10000. ');
  gotoXY(10,12);HighColor;
  write(' Converting: ',OrigId,' to ',ConId,' ! ');NormColor;
  while UserVar<10001 do begin { LOOP CANNOT END USING THIS VALUE }
    gotoXY(5,23);write(' How many ',OrigId,' to convert ? ');
    repeat
      gotoXY(5,24);ClrEol;HighColor;write(' ---->          ');
      gotoXY(13,24);
      readln(UserString);NormColor;
      if UserString='X' then goto PopToHere
      else if UserString='x' then goto PopToHere
      else val(UserString,UserVar,x);
    until (UserVar >=-1000) and (UserVar<=10000);

    DoTheCalculation(Answer);
    gotoXY(1,15); write(' Result: ');
    gotoXY(10,16);ClrEol;write(UserVar:5:5,OrigId);gotoXY(20,17);
    { Printer support can be added here *** }
    ClrEol;
    HighColor;write(' is equal to ',Answer:5:5,ConId);NormColor;
  end { while..do };
end. { Of source listing }

```

#

Flying through programs with the up-and-coming computer aided education language

A Good PILOT for Lost Programmers

By John McCormick

With the perennial presence of BASIC on most small computers, many people try to force their programs to fit the mold of this language, whether it is a good fit or not. Many who know better do this, but I am more concerned with all those who are new to computers and perhaps don't realize there are other languages available at a reasonable cost. Even those who have become familiar enough with programming to know there are other languages, such as assembler or PASCAL, seldom know

about some of the other highly useful languages.

I am always distressed in particular to see teachers attempting to create educational programs in these other languages. Perhaps part of the problem with BASIC is its simple sounding name. I think more people would be willing to tackle some of the other languages (with their sometimes strange-sounding names) if everyone called BASIC by its full name: Beginners' All-purpose Symbolic Instruction Code.

If you think of BASIC in those terms, then a great language like PILOT (Programmed Inquiry, Instruction or Teaching) might receive the attention it deserves from those who want to prepare question-and-answer sessions for use on their computer.

I know BASIC or even PASCAL can be used to produce a program that will solicit responses to a series of questions, but you haven't lived until you've seen how easy this sort of program is to write

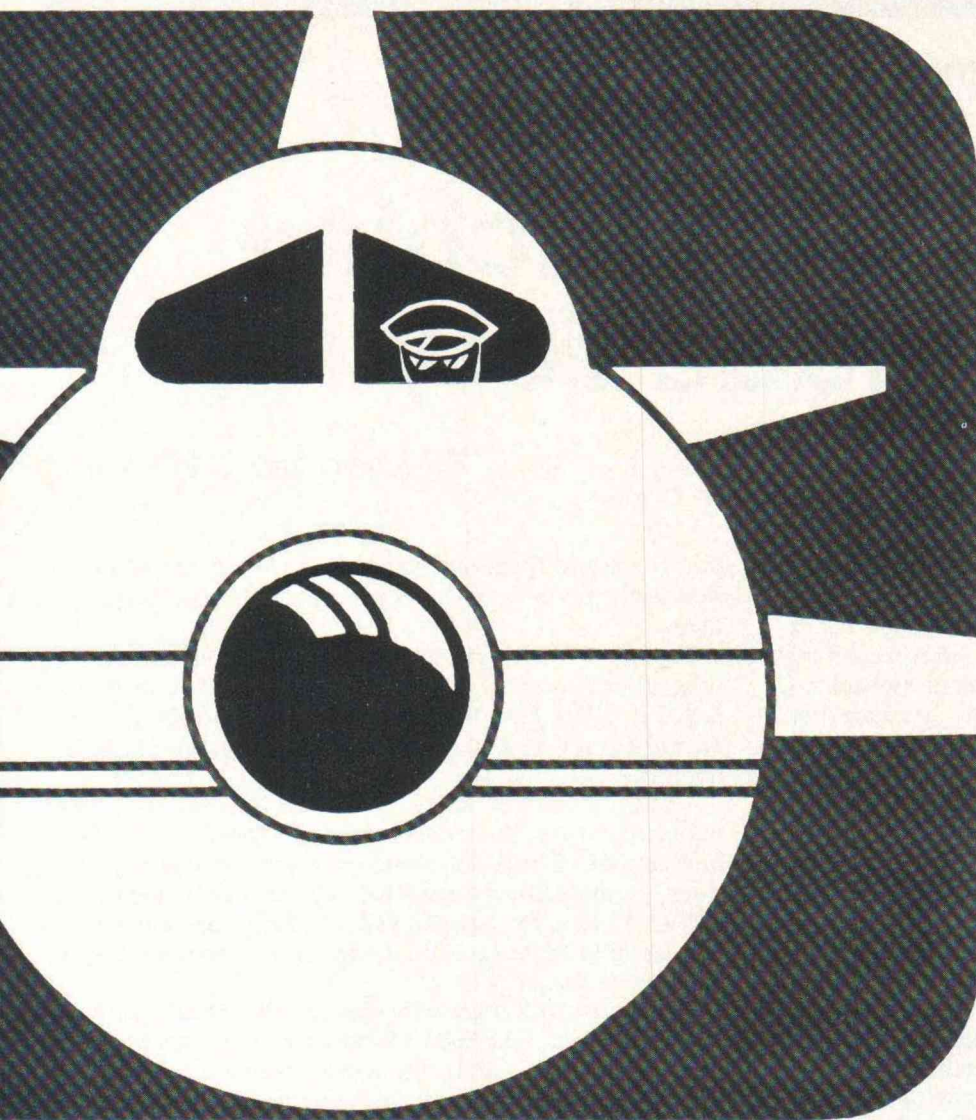
in PILOT. Don't get me wrong; PASCAL is a great language and BASIC is probably not as bad as many of its critics claim, but the reason there are literally hundreds of different languages is simple: each language is designed to do a different job and do it more easily than other languages.

PILOT is designed specifically for teachers and for writing programs that work the way most teachers teach (or would like to have the time to teach) — through a dialog with students, giving hints where necessary.

OK, so I have another language I want you to learn; it must be hard or people would be using it instead of BASIC, right? Wrong! PILOT is incredibly easy to use for writing simple programs, unlike BASIC or other languages that require a fairly complete understanding of complex commands and punctuation to write even simple code. Here is an example of a PILOT program:

T: Is 2+2+2=5? (the command T:

John McCormick is a free-lance writer and computer consultant who studied physics and math in college. He was formerly with Wang Labs where he worked with IBM mainframes. He has also written a number of product reviews for PCM and its sister publication, THE RAINBOW.



causes text to be printed on the screen)

A: gets a response from keyboard

M: no (this tests for a match with the specified text no)

TY:CORRECT !! (TY: displays the text if a match is made)

TN:SORRY, THAT ISN'T CORRECT (TN: displays this text if the keyboard response A: does not match the contents of M:, here no)

That's it! This is a "runable" PILOT program, although you might want to add a few more questions to your session, it should give you the idea. Pretty simple, isn't it? Yet it asked a question (displayed it on the screen), waited for an answer and responded to the answer. How quickly could you write that program in BASIC?

If you want to run a series of questions past the student, all you need do is enter that series of : commands into a word processor file and use the word processor's COPY command to produce

as long a program as you want. That's right! This language is so simple to use that you can extend Q&A sessions by just using your word processor's COPY function to produce more lines of code, then filling in the questions and responses you want. What could be simpler?

PILOT also provides an easy way to provide additional information dependent on the given answer. Remember, this language is designed for programmed learning and that is how programmed learning operates: first some text gives information, next a question is asked to test understanding, then additional help is given in the area where it is needed.

How about writing information from a BASIC program that is longer than one screen full? How do you make the longer text easy to read using BASIC? Using PILOT's FOOT: command, the program stops and prints a message at the bottom (foot) of the screen, such as Press RETURN to go on, then goes to

the next page when the RETURN button is depressed. That's all, just FOOT:, no INKEY\$ or anything else. The PILOT language provides all that, just as it provides all the strings needed for the matching and keyboard entry functions.

PILOT also has other commands, such as PAUSE:, that make this sort of programming easier. For example, PAUSE:n causes the program to pause for 'n' seconds, a very useful command. Switching to other topics dependent on answers and simple computation are other functions available to the PILOT programmer, along with commands to keep track of scores or correct answers to questions.

PILOT is so much faster than BASIC for writing these question-and-answer types of programs that I write the code much faster than I can think up good questions, certainly something that doesn't happen with BASIC. I have no trouble turning out a 20- or 30-question-and-answer program in an hour or less. I am only slowed down by stopping to think up questions and most of the time is taken up typing in the text — the actual programming takes only a minute or two.

So where do you find this miraculous language, and how much does it cost? One of the best inexpensive PILOT interpreters is available from Ellis Computing, complete with a good, easy-to-read instruction manual and several sample programs for \$39.95. This package even includes a program that leads you through questions and answers while creating a PILOT program for you.

If you use computers in training or teaching, I urge you to look into PILOT. This language is easier to learn than many educational programs I have used, and it offers the opportunity to write unlimited numbers of different programs for your own use.

PILOT doesn't do everything, for instance, it can't be used to balance your checkbook or solve problems of any sort. The reason PILOT is easy to use and simple to learn is that it only performs certain functions. PILOT is not a general purpose language like BASIC or PASCAL, which can do almost anything (though they do almost nothing very easily), but if your work is the kind PILOT is designed to do, then you will bless the day you found it.

(Ellis Computing's address is: 3917 Noriega St., San Francisco, CA 94122.)

PCM

*Machine language programming
on your Portable*

Model 100 Machine Code Made Easy

By Michael R. Henning

The execution speed of machine code compared with a BASIC interpreter is like the difference between night and day. Machine code executes much faster because each byte does not have to be interpreted by software into hardware terms. The primary drawback to using machine code is having to manually generate the numeric values for the code since most PCs only come equipped with BASIC.

The first computer languages were called "assemblers." The purpose of an assembler is to eliminate the work of generating numeric values representing machine code. The assembler input is a set of machine code mnemonics that mean more to the programmer than a series of ones and zeros. Through the use of labels, data and mnemonics, the programmer can generate a program that runs in direct code and performs a specific function.

This article describes the 8085 assembler enclosed in Listing 2. This is a two-pass assembler written in BASIC for use on the TRS-80 Model 100. Because of the necessity to conserve memory and the I/O limitations of the Model 100, a quasi-dual pass assembly and only basic error-checking are the two characteristics of this program.

Dual-pass assembly means each source statement is analyzed twice. This is a quasi-dual pass assembler because the first pass is only used to generate the label table and no intermediate code is generated. Consequently, the input code is actually assembled twice. This takes longer to run than a single-pass assembler but it allows forward referencing during assembly.

The mnemonic language used for the 8085 is the same as the 8080 with the addition of the SIM/RIM instructions. There are three different types of instructions that, for the purposes of this article, we will call Format I, II and III.

Format I instructions are those defined in a single byte. An example of a Format I instruction is a PUSH B. This instruction is totally defined by the operation code C5 Hex. It means push the contents of the Register BC pair onto the stack. Another example of a Format I instruction is MOV A,B. This is represented by the Hex code 78. This is a one-byte instruction with two fields that contain operand data.

In this case, bits 3 to 5 represent 'A' (seven) and bits 0

to 2 represent 'B' (zero). All Format I instructions are one byte and may or may not have operands associated with them.

Format II instructions occupy two bytes. These use immediate operands. An example of a Format II instruction is MVI A,177D. This instruction moves 177 octal to Register A. The second byte in the Format II instructions is always the immediate operand.

The final class of instruction is the Format III. In like manner, Format III uses three bytes. These are the direct instructions of load/store and program branching instructions, jumps/calls. An example of a Format III instruction is CALL FF00H. Its execution causes the program to call the routine at FF00 hexadecimal and put the current program counter on the stack.

The instruction repertoire is available in many different places. Books on the 8085 and machine language programming are available and very helpful. Table 1 gives a list of instruction mnemonics and the operands expected by the assembler.

The input to this assembler program is somewhat free form. Labels must begin in Column 1. All operators must be separated by at least one space, a comma, a tab, or a plus or minus sign. Comments may be added to the input line following a period and, for the sake of attractive output, should be limited to 20 characters. The following is an example of an input line.

	1		2		3		4
1234567890	1234567890	1234567890	1234567890				
LABEL	JMP LABEL+10	.	EXAMPLE				

The only restriction on a label is that it cannot be named REM and cannot end with a 'B', 'D', 'H' or 'O'. REM is used to denote a remark and causes all data up to the next carriage return to be printed out. No attempt is made to find any valid statements in a remark. REM must begin in Column 1 just like a label. The endings 'B', 'D', 'H' and 'O' are reserved for numeric operands.

The program allows any size label but the output only uses a maximum of eight characters. My personal preference for labels is no more than seven characters; that way I can use tabs to separate labels and mnemonics. Another restriction of labels is that only 256 are allowed. This is to save memory and can be expanded by changing the program

Michael Henning is a systems analyst for Sperry Corporation. He has over 20 years of experience working with computers.

at lines 5, 40 and 1350. Labels are optional on all statements with the exception of EQU, which requires a label.

Two arithmetic operators are allowed on operands. Any label or numeric operand can be modified with a plus or minus sign and a decimal number. Therefore, in the example line, the jump would be to the address of LABEL+10 decimal.

Numeric operands must designate whether they are binary, octal, decimal or hexadecimal. These different number bases are shown by 'B', 'O', 'D' or 'H', respectively, in the last digit of the field. Therefore, 177O represents 177 octal. If the number base is left off, the assembler treats the number as a label. The exception to this rule is arithmetic modification, described in the previous paragraph, which is always a decimal number and cannot have a number base identifier.

In addition to numeric values, the '\$' signifies the current contents of the address counter. If an operand such as \$+2 is used, the generation is the current address of the instruction being assembled plus two.

In addition to the full 8085 mnemonic table, the assembler uses the following special mnemonics:

- ENTRY — This is used to note the entry point of the program. The format is [label] ENTRY [numeric value]. It has no significance for the program and serves only as a programmer reminder.
- DATA — This mnemonic is used to designate input data. The format is [label] DATA [operand]. The generation for the data statement is either one or two bytes. If the operand, which can be a numeric expression or label, is in the range 0-255, one byte is allocated. If the value is 256-65,535, then two bytes are allocated.
- EQU — EQU allows the programmer to equate a value to a label. The format is [label] EQU [operand]. The operand can be a numeric expression or a label. The EQU operator must have a label.
- ORG — ORG allows the programmer to set up the address counter. ORG is normally the first mnemonic encountered and contains the start address of the assembly in the format, [label] ORG [numeric value]. In addition, ORGs can be placed anywhere the address counter needs to be changed.
- RES — RES is used to reserve a number of bytes of data. The format is [label] RES [number of bytes]. This instruction increments the address counter to reserve a specified number of bytes for dynamic storage.
- STR — This operator allows the programmer to enter ASCII string data. The format is [label] STR [xxxxxxxx], where xxxxxxxx is string data.
- END — This is the final statement in the assembly. The format is [label] END. The label is optional but the statement must be included or a fatal assembly error occurs.

The program contains a limited amount of error checking, and the following errors may appear on the output listing:

- *I* (Instruction error) — This occurs when a mnemonic is not recognized or there are improper fields in the statement.
- *U* (Undefined error) — This error occurs when a label used as an operand cannot be found in the label table.
- *D* (Duplicate definition) — This occurs when a label being used has been previously defined.
- *W* (Warning) — Occurs when the data in an operand overflows the maximum possible value.

In addition, the assembler gets a fatal error if there are operands it does not understand. The assembly stops and all files are closed. As previously mentioned, if there is no END statement in the program, a fatal error also occurs.

The program allows the programmer to specify the name and device for the input file and the print file. The operator also specifies whether an object file is desired. The object file is a text file that contains hexadecimal addresses and generated code data.

The program in Listing 1 loads the object file into memory. The loader program sets HIMEM to the first address encountered in the object file and loads the program into memory. At completion, the first and last addresses and the number of bytes are displayed. The loader program requires no operator intervention.

The printed output of the program is set up for an Epson RX-80. The format is in 80 columns and includes headers. If this needs to be changed for your printer, the control codes are contained in lines 1520 and 1600.

My objective in writing this program was to provide a versatile assembler that could use all of the capabilities of the Model 100 and not use all of its memory. Because the device for the files can be designated, larger input files can be read from tape (the file should be on tape twice, once for each pass). The output can be directed to the printer, and leftover memory can be used for the object file and an expanded label table.

For those who have access to CompuServe, the following files are in the XA4 database of the Model 100 Users Group (PCS-154):

ASM.BA	Assembler program
LDASM.BA	Loader program
ASM.DOC	Assembler documentation
ASMEX.TXT	Sample assembly

Table 2 is a sample input file for an assemble and Table 3 is the assemble output.

If you have any questions concerning this program you may contact Mr. Henning at P.O. Box 2155, Arlington, VA 22202, phone (703) 548-2989. Please enclose an SASE when writing. □

Table 1

FORMAT I

MOV r1,r2	Move register to register	STAX d	Store A indirect
LDAX d	Load A indirect	XCHG	Exchange HL and DE
registers			
PUSH s	Put register pair on stack	POP s	Get register pair
from stack			
XTHL	Exchange top of stack and HL	SPHL	HL pair to stack
pointer			
INX t	Increment 16 bit register	DCX t	Decrement 16 bit

register			
PCHL	HL to program counter	RET	Unconditional return
RC	Return on carry	RNC	Return on no carry
RZ	Return on zero	RNZ	Return on not zero
RP	Return on positive	RM	Return on negative
RPE	Return on parity even	RPO	Return on parity odd
RST u	Restart at address u	INR r	Increment register
DCR r	Decrement register	ADD r	Add A + r
ADC r	Add A + r with carry	DAD t	Add HL + t
SUB r	Subtract A - r	SBB r	Subtract A - r with borrow
ANA r	And A with r	XRA r	Exclusive or A with r
ORA r	Or A with r	CMP r	Compare A with r
RLC	Rotate A left	RRC	Rotate A right
RAL	Rotate A left through carry	RAR	Rotate A right through carry
CMA	Complement A	STC	Set carry flag
CMC	Complement carry flag	DAA	Decimal adjust A
EI	Enable interrupts	DI	Disable interrupts
NOP	No operation	HLT	Halt
RIM	Read interrupt mask	SIM	Set interrupt mask

FORMAT II

MVI r,opl	Move immediate to r	ADI opl	Add A + opl
ACI opl	Add A + opl with carry	SUI opl	Subtract A - opl
SBI opl	Subtract A - opl with borrow	ANI opl	And A with opl
XRI opl	Exclusive or A with opl	ORI opl	Or A with opl
CPI opl	Compare A with opl	IN opl	Input A from chan opl
OUT opl	Output A on chan opl		

FORMAT III

LXI t,op2	Load immediate register pair	STA op2	Store A direct
LDA op2	Load A direct	SHLD op2	Store HL direct
LHLD op2	Load HL direct	JMP op2	Unconditional jump
JC op2	Jump on carry	JNC op2	Jump on no carry
JZ op2	Jump on zero	JNZ op2	Jump on not zero
JP op2	Jump on positive	JM op2	Jump on negative
JPE op2	Jump on parity even	JPO op2	Jump on parity odd
CALL op2	Unconditional call	CC op2	Call on carry
CNC op2	Call on no carry	CZ op2	Call on zero
CNZ op2	Call on not zero	CP op2	Call on positive
CM op2	Call on negative	CPE op2	Call on parity even
CPO op2	Call on parity odd		

SPECIAL ASSEMBLER CODES

DATA opl or allocated for	op2	Data for use by assembled code. 1 byte opl, 2 bytes allocated when op2 > 255.
END		Required at the end of the program.
ENTRY op2		Entrance address to the assembled code.
[LABEL] EQU opl or op2		Equates value to label.
ORG op2		Sets address counter to value of op2.
REM		Remark, must start in column 1.
RES opl or op2		Reserves number of bytes specified in operand.
STR [string]		Allocates 1 byte to every string character
\$		Operand designating current value of address counter.

r = B,C,D,E,H,L,M(contents of HL),A

d = B,D

s = B,D,H,PSW

t = B,D,H,SP

u = 0,8,10,18,20,28,30,38

opl = numeric or label operand

0-255

op2 = numeric or label operand 0-65535

Grow up!

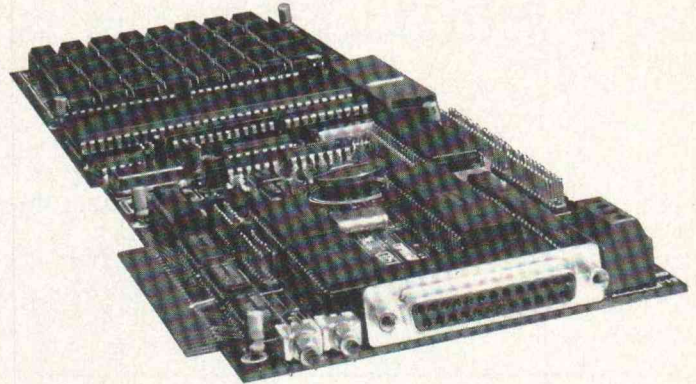
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Table 2

```

REM *****
REM  SAMPLE PROGRAM FOR 8085 ASSEMBLER WRITTEN BY M. HENNING.
REM *****
BEGIN  ORG      62000D  .START ADDRESS
START  ENTRY    TEST    .ENTRANCE BYTE
DATA1  DATA    1770    .177 OCTAL
DATA2  DATA    01001B  .BINARY 9
DATA3  DATA    32768D  .DECIMAL NUMBER
DATA4  DATA    FF00H   .HEX NUMBER
EQUAL1 EQU      DATA1+4 .EQUATE
DATA5  RES      10H     .RESERVE 16 BTS
STRING STR      THIS IS A TEST.STR DATA
REM *****
REM                               END DATA
REM *****
TEST   MOV      A,B      .MOVE B TO A
        JMP     $+2      .JUMP 2 BYTES
        CPI     FFH      .COMPARE A
        JZ      TEST1    .FORWARD REFER
        CALL    DATA4    .CALL
TEST   MVI      D,89D    .DUPLICATE LBL
TEST1  CPI      EQUAL1    .WARNING
        END        .END SAMPLE

```

Table 3

*** 19:00:00 07/02/84 ***

#PAGE 1

ERROR LINE NO.	ADDR	CODE	LABEL	MNEMONIC	COMMENTS
----------------	------	------	-------	----------	----------

REM *****

REM SAMPLE PROGRAM FOR 8085 ASSEMBLER WRITTEN BY M. HENNING.

REM *****

00001	F230		BEGIN	ORG	62000D0 .START ADDRESS
00002		54 F2	ENTRY	ENTRY	TEST0.ENTRANCE BYTE
00003	F230	7F	DATA1	DATA	17706.177 OCTAL
00004	F231	09	DATA2	DATA	01001B0.BINARY 9
00005	F232	00 80	DATA3	DATA	32768D0.DECIMAL NUMBER
00006	F234	00 FF	DATA4	DATA	FF00H0.HEX NUMBER
00007		34 F2	EQUAL1	EQU	DATA1+40.EQUATE
00008	F236		DATA5	RES	10H0.RESERVE 16 BTS
00009	F246	54	STRING	STR	T0.STR DATA
00010	F247	48			H0
00011	F248	49			I0
00012	F249	53			S0
00013	F24A	20			0
00014	F24B	49			I0
00015	F24C	53			S0
00016	F24D	20			0
00017	F24E	41			A0
00018	F24F	20			0
00019	F250	54			T0
00020	F251	45			E0
00021	F252	53			S0
00022	F253	54			T0

REM *****

REM END DATA

REM *****

00023	F254	78	TEST	MOV	A,B0.MOVE B TO A
-------	------	----	------	-----	------------------

	00024	F255	C3 57 F2	JMP	\$+26.JUMP 2 BYTES
	00025	F258	FE FF	CPI	FFH6.COMPARE A
	00026	F25A	CA 62 F2	JZ	TEST16.FORWARD REFER
	00027	F25D	CD 34 F2	CALL	DATA46.CALL
D	00028	F260	16 59	TEST	MVI D,89D6.DUPLICATE LBL
W	0002				

Listing 1:



```

5 DEFSTR F
6 DEFSNG T
10 OPEN "OBJT.DO"FORINPUTAS1
11 INPUT #1,AS
12 GOSUB 1000
13 CLEAR 256,T
14 DEFSTR F
15 DEFSNG T
16 OPEN"OBJT.DO"FORINPUTAS1
20 IFEOF(1)THEN300
30 INPUT#1,AS
35 IFA$="END"THEN300
40 IFLEN(AS)<4THEN200
50 GOSUB1000
60 IFBG=0THENBG=T
70 AD=T
80 GOTO30
200 GOSUB1000
210 POKE AD,T
215 AD=AD+1
220 GOTO30
300 CLS:PRINT@40,"BEGINING ADDRESS: ";CHR$(9);BG;
310 PRINT@80,"ENDING ADDRESS: ";CHR$(9);CHR$(9);AD-1;
320 PRINT@120,"LENGTH:      ";CHR$(9);CHR$(9);AD-BG
330 CLOSE
340 END
1000 T=0
1010 FORX=1TOLEN(AS)
1020 F=MID$(AS,X,1)
1030 IFASC(F)>47ANDASC(F)<58THENT1=ASC(F)-48ELSE T1=ASC(F)-55
1040 T=T*16+T1
1050 NEXT
1060 RETURN

```

Listing 2:



```

1 MAXFILES=3
5 CLEAR2000
6 ONERRORGOTO3220
10 DEFINTX,F
20 DEFSTRF,H,L,R,E
30 DEFSNGT,V
40 DIMH(6),R1(7),R2(3),R3(3),R4(87),LBL(256),V(256)
50 XX=0:PC=1:LC!=59:E1="":LN="00001":XA=2
55 GOSUB9950
60 CLS
70 INPUT"ENTER INPUT FILE NAME: ";FI
80 INPUT"ENTER LISTING FILE NAME: ";FL
85 INPUT"DO YOU WANT AND OBJECT OUTPUT (Y/N)";FO:IFFO="Y"THENFO="OBJT"ELSEFO=""
87 P=0
88 CLS:PRINT@137,"PASS ";P+1::XX=0:AD=0
90 OPEN FI FORINPUTAS1
100 IFP<0THENOPENFLFOROUTPUTAS3
105 IF FO<" "ANDP<0THENOPENFOFOROUTPUTAS2
110 H(0)="":H(1)="":H(2)="":H(3)="":H(4)="":H(5)="":H(6)=" "
115 E1=""
120 O1=0:O2=0:O3=0

```

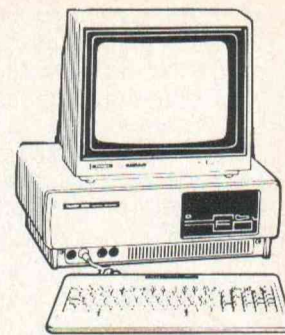


```

130 GOSUB1000
140 IFF1<>"THENT=AC:GOSUB1350
145 IFF1="REM"THENGOTO3230
150 GOSUB1450
160 ONINT((XZ-1)/10)+1GOTO170,180,190,200,210,220,230,235,240
170 ONXZGOSUB2000,2036,2072,2112,2112,2144,2144,2180,2180,2196:GOTO110
180 ONXZ-10GOSUB2200,2208,2224,2236,2248,2248,2264,2264,2264,2264:GOTO110
190 ONXZ-20GOSUB2264,2264,2264,2264,2264,2280,2292,2292,2292,2292:GOTO110
200 ONXZ-30GOSUB2292,2292,2292,2292,2292,2308,2308,2308,2308,2308:GOTO110
210 ONXZ-40GOSUB2308,2308,2308,2308,2324,2336,2336,2416,2416,2416:GOTO110
220 ONXZ-50GOSUB2416,2416,2416,2416,2416,2432,2432,2432,2432,2432:GOTO110
230 ONXZ-60GOSUB2432,2432,2432,2452,2452,2452,2452,2452,2452,2452:GOTO110
235 ONXZ-70GOSUB2452,2464,2464,2476,2476,2488,2500,2512,2512,2524:GOTO110
240 ONXZ-80GOSUB3102,3046,3066,3080,3080,3115,1662:GOTO110
1000 F1="":F2="":F3="":F4="":F5="":F6="":X=1:NS=0
1016 IFEOF(1)THENCLOSE:GOTO3200
1018 F=INPUT$(1,1)
1019 IFX=2ANDF1="REM"THENX=6:NS=0
1020 IFF=CHR$(13)THENRETURN
1021 IFF2="STR"ANDX=3ANDF<>"."THEN1056
1022 IFF=CHR$(10)THEN1016
1024 IFNSAND(F=" "ORF=CHR$(9))THEN1016
1028 NS=0
1032 IFX=6THENF6=F6+F:GOTO1016
1036 IFF=" "ORF=","ORF=CHR$(9)THENX=X+1:NS=1:GOTO1016
1040 IFF="."THENX=6:GOTO1032
1042 IFF="+"ORF="-"THENX=5
1044 ONXGOTO1048,1052,1056,1060,1064
1048 F1=F1+F:GOTO1016
1052 F2=F2+F:GOTO1016
1056 F3=F3+F:GOTO1016
1060 F4=F4+F:GOTO1016
1064 F5=F5+F:GOTO1016
1100 H(X)=" "
1114 IFX1=2ANDT>255THENE1="*W*"
1116 X2=T/16
1120 T=T-X2*16
1124 IFT<10THENH(X)=CHR$(T+48)+H(X)ELSE H(X)=CHR$(T+55)+H(X)
1128 IFX2>0THENT=X2:GOTO1116
1132 GOSUB1150
1136 RETURN
1150 IFLEN(H(X))>=X1THENRETURN
1166 H(X)="0"+H(X)
1170 GOTO1150
1200 FORX2=0TO7
1216 IFH(4)=R1(X2)THENRETURN
1220 NEXT:GOTO1248
1224 FORX2=0TO3
1228 IFH(4)=R2(X2)THENRETURN
1232 NEXT:GOTO1248
1236 FORX2=0TO3
1240 IFH(4)=R3(X2)THENRETURN
1244 NEXT
1248 X2=-1
1250 E1="*I*"
1252 RETURN
1260 T=0
1276 FORX=1TOLEN(H(5))
1280 F=MID$(H(5),X,1)
1284 IFASC(F)>47ANDASC(F)<58THENT1=ASC(F)-48ELSET1=ASC(F)-55
1288 T=T*T2+T1
1292 NEXT
1294 IF T>65535THENE1="*W*"
1296 RETURN
1300 T2=0
1311 IFLEFT$(H(5),1)="$"THENT=AG+VAL(F5):RETURN
1312 IFRIGHT$(H(5),1)="O"THENT2=8
1316 IFRIGHT$(H(5),1)="B"THENT2=2
1320 IFRIGHT$(H(5),1)="D"THENT2=10

```


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```

1322 IFRIGHT$(H(5),1)="" THEN T2=16
1324 IFT2<>0 THEN H(5)=LEFT$(H(5),LEN(H(5))-1):GOSUB1260:RETURN
1326 GOSUB1400:T=T+VAL(F5):RETURN
1332 H(5)=MID$(H(5),2,LEN(H(5))-1):GOTO1324
1350 IFXX=256 THEN CLS:PRINT@125,"SYMBOL TABLE OVERFLOW ":GOTO3208
1363 IFXX=0 THEN 1366
1364 X9=1:H(5)=F1:GOSUB1412:X9=0:IFXZ<>XX THEN E1="*D*":RETURN
1366 LBL(XX)=F1
1370 V(XX)=T
1374 XX=XX+1
1378 RETURN
1400 T=0
1404 IFP=1 THEN PT=XX:XX=PX
1412 FORXZ=0 TO XX-1
1416 IF LBL(XZ)=H(5) THEN T=V(XZ):IFX9 THEN RETURN ELSE GOTO1423
1420 NEXT
1421 IFX9 THEN X9=0:RETURN
1422 E1="*U*":T=0
1423 IFP=1 THEN XX=PT
1424 RETURN
1450 FORXZ=1 TO 87
1466 IF F2=R4(XZ) THEN RETURN
1470 NEXT
1475 E1="*I*":AI=3:H(2)="00":H(3)="00":H(1)="00"
1480 RETURN
1500 IFP=0 THEN RETURN
1502 IF LC!=59 THEN GOSUB1600
1514 IFAD=1 THEN H(0)=""
1516 PRINT#3,USING" \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ ";E1;LN;H(0)
;H(1);H(2);H(3);F1;F2;
1520 IF F4="" THEN PRINT#3,F3;F5;CHR$(137);F6 ELSE PRINT#3,F3;" ";F4;F5;CHR$(137);F6
1522 IF F0<>"" THEN GOSUB1850
1524 AD=0:LC!=LC!+1
1528 T=VAL(LN):T=T+1:LN=STR$(T)
1530 LN=RIGHT$(LN,LEN(LN)-1)
1532 IF LEN(LN)=5 THEN RETURN ELSE FORX=LEN(LN)+1 TO 5:LN="0"+LN:NEXT
1536 RETURN
1600 PRINT#3,CHR$(12);CHR$(27);"e0";CHR$(20);"*** ";TIME$;" " ";DATE$;"
***";CHR$(27);"f0#";"PAGE ";PC
1616 PRINT #3,"ERROR LINE NO. ADDR CODE LABEL MNEMONIC COMM
ENTS"
1620 PRINT #3,STRING$(80,"*"):PRINT#3,:PRINT #3,
1624 PC=PC+1:LC!=5
1628 RETURN
1662 X=0:T=AC:X1=4:GOSUB1100
1666 X1=2:AC=AC+AI:GOSUB1500
1670 RETURN
1700 IFX2=-1 THEN O2=0:E1="*I*" ELSE O2=X2*8
1716 RETURN
1750 H(5)=F3:GOSUB1300
1766 X=5:X1=4:GOSUB1100:X1=2
1770 H(2)=RIGHT$(H(5),2):H(3)=LEFT$(H(5),2)
1774 AI=3:GOSUB1662:RETURN
1790 AI=1:GOTO1662
1794 AI=2:GOTO1662
1800 T=010R020R03
1816 X=1:GOSUB1100
1820 RETURN
1850 IFH(1)="" THEN RETURN
1854 FORXZ=0 TO 3:IFH(XZ)<>"" THEN PRINT#2,H(XZ);",":NEXT
1858 RETURN
2000 O1=64
2008 H(4)=F3:GOSUB1200
2012 GOSUB1700
2016 H(4)=F4:GOSUB1200
2020 IFX2=-1 THEN O3=0:E1="*I*" ELSE O3=X2
2024 GOSUB1800

```



```

2028 GOTO1790
2036 O1=6
2044 H(4)=F3:GOSUB1200
2048 GOSUB1700
2052 X=1:T=O1O2:GOSUB1100
2056 H(5)=F4:GOSUB1300
2060 X=2:GOSUB1100
2064 GOTO1794
2072 H(4)=F3:GOSUB1224
2080 O1=1
2084 GOSUB1700:O2=O2*2
2086 GOSUB1800
2088 H(5)=F4:GOSUB1300
2092 GOSUB1766
2100 RETURN
2112 O1=2
2120 H(4)=F3:GOSUB1224
2124 IFX2=-1ORX2>1THEN02=0:E1="*I*"ELSE02=X2*16
2128 O3=(XZ-4)*8
2132 GOSUB1800
2136 GOTO1790
2144 IFXZ=6THEN01=50ELSE01=58
2152 GOSUB1800
2156 GOSUB1750
2160 RETURN
2180 O1=34:O2=(XZ-8)*8
2188 GOSUB1800
2192 GOSUB1750:RETURN
2196 O1=235:GOSUB1800
2204 GOTO1790
2208 O1=193:O3=(XZ-11)*4:H(4)=F3:GOSUB1236
2216 GOSUB1700:O2=O2*2:GOSUB1800
2220 GOTO1790
2224 O1=227:GOSUB1800
2232 GOTO1790
2236 O1=249:GOSUB1800
2244 GOTO1790
2248 O1=3:O3=(XZ-15)*8:H(4)=F3:GOSUB1224:GOSUB1700:O2=O2*2
2256 GOSUB1800
2260 GOTO1790
2264 IFXZ=17THEN01=195ELSE01=194:O2=(XZ-18)*8
2272 GOSUB1800:GOSUB1750
2276 RETURN
2280 O1=233:GOSUB1800
2288 GOTO1790
2292 IFXZ=27THEN01=205ELSE01=196:O2=(XZ-28)*8
2300 GOSUB1800
2304 GOSUB1750:RETURN
2308 IFXZ=36THEN01=201ELSE01=192:O2=(XZ-37)*8
2316 GOSUB1800
2320 GOTO1790
2324 O1=199:H(5)=F3+"H":GOSUB 1300:IFT/8>7THEN02=0:E1="*I*"ELSE02=T
2332 GOSUB1800
2336 GOTO1790
2390 O1=4:O3=XZ-46:H(4)=F3:GOSUB1200:O2=X2*8
2398 GOSUB1800
2402 GOTO1790
2416 O1=128:O2=(XZ-48)*8:H(4)=F3:GOSUB1200:O3=X2
2424 GOSUB1800
2428 GOTO1790
2432 O1=198:O2=(XZ-56)*8:GOSUB1800
2440 H(5)=F3:GOSUB1300
2444 IFT>255THENE1="*W*"
2448 GOTO2060
2452 O1=7:O2=(XZ-64)*8:GOSUB1800
2460 GOTO1790
2464 O1=211:O2=(XZ-72)*8:GOSUB1800
2472 GOTO2440
2476 O1=243:O2=(XZ-74)*8:GOSUB1800

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```

2484 GOTO1790
2488 01=0:GOSUB1800
2496 GOTO1790
2500 01=118:GOSUB1800
2508 GOTO1790
2512 01=32:02=(XZ-78)*16:GOSUB1800
2520 GOTO1790
2524 01=9:H(4)=F3:GOSUB 1224:02=X2*16
2532 GOSUB1800
2536 GOTO1790
3000 IFF0<"ANDP<0THENPRINT#2,"END";
3001 AD=1:GOSUB 1662:IFP=0THENCLOSE1:PX=XX:P=1:GOTO88
3003 CLS:PRINT@131,"ASSEMBLE COMPLETE";
3004 END
3012 H(5)=F3:GOSUB1300
3020 AC=T
3024 IFF1<"THENV(XX-1)=T
3038 AI=0:GOSUB1662
3042 RETURN
3046 H(5)=F3:GOSUB1300
3054 IFT>255THENAI=2ELSEAI=1
3058 X=1:X1=AI*2:GOSUB1100
3060 IFX1=4THENH(2)=LEFT$(H(1),2):H(1)=RIGHT$(H(1),2)
3062 GOSUB1662:X1=2:RETURN
3066 H(5)=F3:GOSUB1300
3070 IFF1<"THENV(XX-1)=TEELSE1="*I*":T=0
3074 X=5:X1=4:GOSUB1100:X1=2:H(2)=RIGHT$(H(5),2):H(3)=LEFT$(H(5),2)
3082 AD=1:AI=0:GOSUB1662
3086 RETURN
3090 H(5)=F3:GOSUB1300
3098 AI=T:GOSUB1662:RETURN
3102 H(5)=F3:GOSUB1300
3110 F1=F2:GOSUB1350
3114 GOTO3074
3115 H(5)=F3:F3="":
3124 01=ASC(H(5)):H(5)=RIGHT$(H(5),LEN(H(5))-1):F3=CHR$(01)
3128 GOSUB1800:GOSUB1790:F2="":F6="":F1="":
3132 IFH(5)="":THENRETURN
3136 GOTO3124
3200 CLS:PRINT@130,"NO END STATEMENT IN FILE";
3208 PRINT@175,"ABORT ASSEMBLE";
3212 CLOSE:END
3220 CLS:PRINT@120,"UNRECOVERABLE ERROR IN THE BASIC PROGRAM";:GOTO3208
3230 IFP=0THENGOTO110
3232 IFLC!=59THENGOSUB1600
3234 PRINT#3,F1;" ";F6
3238 LC!=LC!+1:GOTO110
9950 FORX=0TO7:READR1(X):NEXT
9960 FORX=0TO3:READR2(X):NEXT
9970 FORX=0TO3:READR3(X):NEXT
9974 FORX=1TO87:READR4(X):NEXT
9978 RETURN
10000 DATA "B","C","D","E","H","L","M","A"
10004 DATA "B","D","H","SP"
10008 DATA "B","D","H","PSW"
10012 DATA "MOV","MVI","LXI","STAX","LDAX","STA","LDA","SHLD","LHLD","XCHG","POP"
"","PUSH","XTHL","SPHL","INX","DCX","JMP"
10014 DATA "JNZ","JZ","JNC","JC","JPO","JPE","JP","JM","PCHL","CALL","CNZ","CZ",""
CNC","CC"
10016 DATA "CPO","CPE","CP","CM","RET","RNZ","RZ","RNC","RC","RPO","RPE","RP","R"
M","RST","INR","DCR","ADD","ADC","SUB"
10018 DATA "SBB","ANA","XRA","ORA","CMP","ADI","ACI","SUI","SBI","ANI","XRI"
10020 DATA "ORI","CPI","RLC","RRC","RAL","RAR","DAA","CMA","STC","CMC","OUT","IN"
"","DI","EI","NOP","HLT","RIM","SIM","DAD"
10022 DATA "ENTRY","DATA","EQU","END","ORG","RES","STR"

```


Uploading Files to Delphi

Last month we began our investigation of the personal Workspace area in the MS-DOS SIG on Delphi. Primarily, we discussed how to upload a file into the Workspace using one of the three supported transfer protocols: ASCII, Xmodem and Kermit. Now let's take a look at what you can do with a file after it's there.

One of the most important things, of course, is to publish a program in the database so that all the other members can download it. This can be one of the generally excellent "usersupported" or "Shareware" programs, or it can be a program that you've written yourself and want to share with others. After all, it's hard not to be proud of a program you've created, slaving over the keyboard, running it over and over until it's just right. And it's a lot more fun when you can share your work with others who will appreciate it as much as you do.

After you have entered your Workspace, the first thing you may want to do prior to making a database submission is to check the directory to ascertain the proper filename of the programs you're about to submit. To do this, you type DIR, just as on your own computer. And remember, too, that the MS-DOS question mark (?) and asterisk (*) wild cards work the same familiar way when used with the DIR command in your Workspace.

After you've checked for the proper filenames, you're ready to begin the submission process. Type SUBMIT. The system responds with a couple of lines of instruction and asks if you wish to continue. Of course, you respond YES, or with a simple Y to save yourself a few keystrokes.

Now the system asks you how many files you will be submitting. One of the nice things about the Delphi database software is that it allows you to "group" related files together under a single description. Let's say you have three files that you're submitting together: a compiled, executable version of your BASIC program; the BASIC source code itself; and a separate file of instructions and documentation. That's three, so you respond with 3 when the system requests this information.

The system then asks you whether all three files are related in such a way that

they should be listed as a single "group" in the directory. In this case, you again respond with YES.

The system then asks you for a "file-type," and displays a list from which to choose: program or program pack, newsletter, article, transcript, documentation, data (graphics, etc.) or miscellaneous text. Since we're dealing with a program here, the proper response is PROGRAM, or simply PRO.

Now the system asks what topic of the database you wish to submit your file to. If you're not familiar with the topics that are available, you can enter a question mark (?) here and the topics will be displayed:

General Information	Archives
Business	Education
Home & Games	Programming
Telecommunications	Utilities
PCM Collection	Info on PCM
Soft Sector Info	SS On Disk

If your submission happens to be a recipe file program, for example, we enter HOM to select the Home & Games topic.

Now a name for the "group/set" is requested. This is the name that appears in the database directory, but you're not limited to a directory entry as you may be accustomed. Here you're allowed up to 32 characters, so you can really use a meaningful name, such as RECIPE FILE DATABASE.

When you're finished naming the group, you are asked to enter a brief description of the file. This is where you should write a little paragraph telling all about your program: the author's name, what the program does, the specific system requirements; anything you can think of that the person who uses it may need to know. When you're finished, enter a CTRL-Z to close the description entry.

Now comes the time when you must enter "keywords" that describe your program. These are simply descriptive words that can later be searched on to locate programs of similar type. The entire directory in a certain topic can be extremely long and confusing, but by searching on these keywords, you can set it to display only those files that are similar to something you're looking for.

The first keyword requested is the "primary" keyword, and must be chosen from a select list that has been installed by the database manager. At the primary keyword prompt, you can once again enter a question mark (?) to display the choices. In the case of the Home & Games topic, the choices are: arcade games, adventure games, finance, management and miscellaneous. In this case, it looks like miscellaneous might be the best choice for our recipe file program, so enter MISC.

You can now enter any other keywords that you like, the idea being to try to imagine what keyword someone else looking for a recipe file program might try to search for. Some possibilities would be "cooking," "recipes," "database," or maybe even "food." You can also put the author's name here and something like "1000" if you know the program runs on the Tandy 1000. Then members who are using the 1000 can start a search on that keyword and only those files will be displayed.

Next you are asked for information about each of the files. The first request is for the filename of the file in your Workspace. You found this earlier when you checked it in the directory. Then you are asked if the file must have any special filename when it is downloaded — generally the same as you uploaded it into your Workspace, but not necessarily. Finally, you are asked for a name to appear with the file in the group directory listing which, again, can be a descriptive name, such as RECIPE FILE DOCUMENTATION.

This naming process is repeated for each of the three files that you are submitting, along with a query as to whether you would like it deleted from your Workspace. When you finish with the filename information for each file, the submission process is complete. Your file then goes to a "preview" area for testing before being moved into the open database for the members.

Although going through all this may seem like a very long, drawn-out process, it really isn't. After you've tried it once, you'll see just how simple it really is.

— Kevin Nickols
MS-DOS SIG Manager

*Improve your numeric-keypad
entry skills*

Hitting the Right Keys

By John McCormick

When I started using my new 1200HD, I soon discovered that the function keys to the left of the keyboard would be very easy to get accustomed to because they are used so seldom, compared with the typewriter keyboard portion.

What I did have trouble with was the numeric keypad on the right side. Sure, it is a great convenience to have all the numbers there and not just spread out across the top of the keyboard with the special characters, but I never had an adding machine in my deprived youth and, consequently, had never learned to use a keypad.

I knew I would eventually pick up a "feel" for the new keys, but I wanted to learn more quickly, so I wrote this little program to generate "random" numbers and check on the accuracy of my keypad entry. With the 1200 it was easy to include a timer, so I added a section to help keep track of your speed.

The program is straightforward and simple, because I don't have time for some of the longer, more sophisticated programs and I think a lot of you probably don't either. After all, this program should make your computer use easier and faster; why make it more complicated than necessary?

This is why I did not provide for decimals and why the average time calculation is only approximate. I feel that learning the numbers is the major problem and most won't even notice where the inaccuracy lies. In any case, the numbers are only useful for comparison with other runs of the same program. I felt the extra lines required to correct these small shortcomings would just mean that many more people would not use the program. □

John McCormick started programming in 1965 while majoring in physics in college, and was formerly employed with Wang Labs. He has written several reviews for THE RAINBOW.

The listing:

```

1 REM BY JOHN MCCORMICK 11/85
10 RANDOMIZE
20 INPUT "SELECT MAXIMUM NUMBER OF DIGITS..",N
25 T =TIMER
30 X= (INT(RND*(10^N)))
35 CLS
37 C = TIMER
40 PRINT, "TOTAL TRIES" NUMBER, "NUMBER WRONG" WRONG "ELAPSED TIME"INT(C-T)"
SECONDS":PRINT:PRINT:PRINT
41 IF NUMBER = 0 GOTO 45
42 PRINT "PERCENT WRONG..." INT((WRONG/NUMBER)*100)"%"
43 PRINT "AVERAGE TIME REQUIRED FOR ONE CORRECT"N"DIGIT ENTRY..."INT((C-T)/(NUMBER - WRONG))"SECONDS"
45 PRINT:PRINT:PRINT:PRINT:PRINT
49 PRINT"NUMBER....."X
50 INPUT "INPUT FROM KEYPAD.. ",Y
55 NUMBER = NUMBER + 1
60 IF Y = X THEN GOTO 30 ELSE BEEP
61 WRONG = WRONG + 1
65 CLS
70 PRINT "WRONG, TRY A NEW NUMBER"
75 FOR A = 1 TO 250
76 NEXT A
100 GOTO 30
200 END

```

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*Your computer
turns the tables
and gives you a
chance to do some
deductive reasoning*

Color Code Combo

By Dan Bishop

In *Color Code Combo*, the computer selects a random sequence of colors (represented by their first letters, such as 'R' for red, 'O' for orange, etc.). The number of colors used is determined by the player at the beginning of each game, and may range from three to eight. The player also selects the length of the sequence, from three to eight, which might or might not match the number of colors chosen. The computer may repeat colors within the sequence or may completely omit some colors. The bottom line of the display shows the colors allowed for the current game.

The player then has 12 opportunities to guess what the coded sequence might be. All 12 guesses remain on the screen for reference. After each guess, the player may select Option 'X' to go back and change the guess just entered, or Option 'E' to have the guess evaluated by

Dan Bishop owns and operates a computer consulting and custom programming firm in Buena Vista, Colorado, and teaches computer science courses at Colorado Mountain College in Leadville, Colorado. At an elevation of 10,000 feet, CMC is the nation's highest institution of higher learning.

the computer and end that turn. When evaluating a guess, the program first checks to see how many colors in the guess match colors in the secret code. It then determines how many of these correct colors are located in the correct place within the sequence. Both of these results are displayed alongside the guess.

After several guesses, the player should be able to use the evaluations presented for each guess to deduce the correct sequence of colors in the code. If the code has not been correctly guessed after 12 tries, the secret code is displayed and the game is over. The number of colors

and length of the sequence used for a given game may be changed at the beginning of each round.

I have found the game to be very entertaining for ages four or five through adult. Preschoolers can be started on a three-color by three-position game and, with help from an adult, can gain experience in making logical deductions from limited information. Adults can find the eight-by-eight game an extremely challenging experience. And with the use of the random color selector within the program, seldom (if ever) will you find two games with the exact same secret code. □

The listing:



```
1 REM COLOR CODE COMBO
2 REM C 1984 By D. Bishop
10 DIM A$(12),C(12),L(12):CLS:PRINT"COLO
R CODE COMBO":A$="]## \ \ # #[" :B
$="Choices:   col loc           col lo
c":D$="  X E  (X:correction E:evaluate)
"
20 PRINT@135,"RANDOMIZING":FOR I=1 TO (V
AL(MID$(TIME$,4,2))*20+VAL(RIGHT$(TIME$,
2))):X=WND(1):NEXT I
100 FOR I=0 TO 12:C(I)=0:L(I)=0:A$(I)="
":NEXT I:C$=" ROYGBPWV"
110 PRINT@201,"How many colors (3-8)":T
$=INPUT$(1):C=VAL(T$):IF C<3 OR C>8 THEN
110
120 PRINT" --> "C:C$=LEFT$(C$,2+C)+" X
"+STRING$(8-C,32)
130 PRINT@281,"How many locations (3-8)"
```



```

;:T$=INPUT$(1):T=VAL(T$):IF T<3 OR T>8 T
HEN 130
140 PRINT"--> "T:FOR I=1 TO T:MID$(A$(0)
,I,1)=MID$(C$,2+INT(RND(1)*C+1)):NEXT I
200 FOR K=1 TO 12:KK=-(K>6):GOSUB 500:PR
INTC$;G$=""
210 FOR L=1 TO T:CL=40*(K-1)+1-221*KK:PR
INT@CL+2+L,"";Y$=INPUT$(1):IF Y$="X" TH
EN L=L-2-(L<2):G$=LEFT$(G$,L):GOTO 250
220 II=0:FOR I=1 TO C:IF Y$=MID$(C$,2+I,
1) THEN II=I:I=C
230 NEXT I:IF II=0 THEN Y$=" ":L=L-1:GOT
O 250
240 PRINT@CL+2+L,Y$;G$=G$+Y$
250 NEXT L
260 A$(K)=G$:PRINT@281,D$;Y$=INPUT$(1):
IF Y$="X" THEN K=K-1:GOTO 280ELSE IF Y$<
>"E" THEN 260
270 GOSUB 400:IF L(K)=T THEN KK=K: K=1
2
280 NEXT K
300 IF L(KK)=T THEN BEEP: P
RINT@281,"YOU WIN! ";:GOTO 31
0ELSE PRINT@281,"SORRY! ANS=";A$(0);
310 PRINT@302,"TRY AGAIN? (Y/N)";Y$=INP
UT$(1):IF Y$="Y" THEN CLS:GOTO 100ELSE I
F Y$<>"N" THEN 310
320 CLS:END
400 L(K)=0:RT$=A$(0):FOR I=1 TO T:IF MID
$(G$,I,1)=MID$(A$(0),I,1)THEN L(K)=L(K)+
1
410 NEXT I:J=0:C(K)=0
419 FOR I=1 TO T
420 J=J+1:IF MID$(G$,I,1)=MID$(A$(0),J,1
)THEN C(K)=C(K)+1:MID$(A$(0),J,1)=" ":GO
TO 440
430 IF J<T THEN 420
440 J=0:NEXT I
450 A$(0)=RT$:RETURN
500 CLS:FOR I=1 TO 6:II=I+6:PRINT USING
A$+A$;I,A$(I),C(I),L(I),II,A$(II),C(II),
L(II):NEXT I:PRINT B$:RETURN

```

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Discover the Artist in You with *PC Paintbrush*

Software

1000/1200/3000

PC Paintbrush is the best software package I've had the pleasure of reviewing for a long time. I knew, before I even made backups, how the program was designed to work and couldn't wait to get it running. I have a degree in art and love to use quality graphics programs on my computers. The reason for my excitement becomes more apparent when you consider that *PC Paintbrush* is one of the best selling "MacPaint-type" programs available for MS-DOS computers. And it's better than *MacPaint* because *PC Paintbrush* is in glorious color.

The system you need to run *PC Paintbrush* includes 320K of memory (probably more on the Tandy 1000) one disk drive, a graphics display, MS-DOS 2.0 or above and a mouse, joystick or digitizer. On the Tandy machines you will want to make sure you have the Tandy Mouse or a digitizer installed. *PC Paintbrush* does not work with the joystick ports on the front of the Tandy 1000.

It Has It All

If you aren't familiar with the *MacPaint*-style of graphics software, let me quickly try to explain. You use the mouse (input device) to move a cursor about the screen selecting tools, such as paintbrushes, lines, circles, boxes and filled shapes to name a few, and then pointing or dragging the tool across the graphics area to create different effects and colors. Selecting colors is the same; point and click from a palette of colors at the bottom of the screen.

The tools available on the main menu of *PC Paintbrush* icons include a spray can, scissors, editing box, eraser, color eraser, paintbrushes, line, curve, box, circle, rounded corner box, and the last

three again, filled. Also, there are pull down menus for editing, changing brush shapes, file I/O, editing patterns, changing text fonts and sizes, scroll bars, undo and more.

The Standout Features

Some of the features found in *PC Paintbrush* are particularly impressive. In addition to color, *PC Paintbrush* has patterns that may also be edited, saved and loaded. This is like *MacPaint*; but of course, with colored patterns.

You don't have to scroll much with *PC Paintbrush* because it is possible to click the menu off and work over the entire screen with many of the tools. However, not all the tools can be "carried" to the full screen with menu off.

The printer software included with *PC Paintbrush*, *Frieze*, is another reason I find this package particularly impressive.

One of the nicest features, for my money, is the large set of fonts available and the different point sizes you may select. You may select from a range of nine different point sizes which are, of course, proportional to the size of printout you select using *Frieze*. Also, the styles menu has a full set of selections including light, medium, bold, italics, underline, outline, kerning and shadow. The font styles include Computer, Old English, Roman, Light Roman and Script.

The color eraser is a really interesting and powerful feature. With it, you select a foreground color/pattern to be replaced by a background color/pattern. You may change the size of the color eraser using the line weight settings. In fact, many of the other tools, in addition to line and circle functions, have their size controlled by the line weight setting.

Frieze

Included with *PC Paintbrush* is a program mentioned earlier called

Frieze. It is a self-contained program for printing *PC Paintbrush* pictures and loading graphics from other software into *PC Paintbrush* for improvement and enhancement.

Frieze will print sections of a graphics screen or the entire screen, normal or sideways, reduced or enlarged and with a selected left margin width. It also allows you to save and restore a screen or section of a screen to and from a diskette. *Frieze* works on other graphics programs including *Lotus 1-2-3*, and *Symphony*. The *PC Paintbrush* manual includes complete instructions on using *Frieze*. *PC Paintbrush* supports a wide range of dot-matrix printers and plotters, so *Frieze* is a valuable addition to the software package.

You may enlarge or reduce a screen or section of a screen from one inch by one inch up to two feet by 300 feet. *Frieze* attaches itself to DOS, so you can invoke it after leaving *PC Paintbrush*. It can be modified easily or used with its current default settings. The defaults can also be changed. You may change color patterns for dot-matrix printers or set colors for a plotter.

Installing for the Tandy Mouse

One minor problem I ran into while installing *PC Paintbrush* concerned getting it to work with the Tandy Digital Mouse. There is no selection for the Tandy Digital Mouse in the input device section of the installation program. To do this installation you should configure the rest of your system and leave the input device as it is shipped — Joystick. Then, using Edlin or another MS-DOS-compatible editor, edit the first line of a file called PSETUP.DAT. Change the character J to an M and save it back to diskette. Now, as long as your CONFIG.SYS file loads MOUSE.SYS and then boots *PC Paintbrush*, your Tandy Digital Mouse will work wonderfully well. After contacting the courteous help at Z-Soft for instructions on doing this installation, I believe that in the near future subsequent copies of *PC Paintbrush* will have the instructions for this process included.

In general, I found the installation easy and quick, even though I had to do a few extra steps for the Tandy Digital Mouse. The installation process is completely menu-driven and easy to

understand. As a final note about the installation, *PC Paintbrush* supports 19 video graphics cards including one card that supports 512 by 512 resolution with 256 colors and the IBM EGA standard. *PC Paintbrush* also supports 30 different printers and plotters.

In Summary

I highly recommend *PC Paintbrush* to anyone. It is a well-designed program that practically requires no manual to operate on first start-up. If you have ever had the desire to create color graphics in the style of the *MacPaint* software, this package is for you.

The addition of *Frieze* makes the package even more complete and adds to your already growing MS-DOS system. The people at Z-Soft are to be congratulated for an excellent package at a fair price. In addition, they are courteous and helpful over the phone in providing technical support.

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— Bobby Ballard



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With the 4N1 board, you can add 512K of memory to bring the machine up to 640K total. You can add the memory in increments of 64K, 128K or 256K as you choose. The board also contains the DMA chip needed to use the larger amount of memory. This chip also affords more compatibility with many of the software programs available under MS-DOS.

Another standard feature included is an RS-232 serial port for communications.

Options for the board include a clock or a combination of clock and Digi-Mouse port.

Support

When I plunk down my hard-earned bucks on anyone's product, I expect their backing if I have a question or something goes awry. I believe Micro Mainframe fulfills the requirements here. I found Mark Menz and his staff to be helpful, friendly and most of all, knowledgeable. They maintain a voice help line and a BBS for buyers of their products. The BBS contains tips and software, including a RAM disk and other utilities. They have been supplying third-party hardware for Tandy machines since shortly after the introduction of the Model I.

As for installation, there really isn't much to do! Just remove the computer cover and plug the board directly into any of the available slots. The whole operation shouldn't take more than a few minutes. The instruction booklet I

received with the review copy was not very complete and led me to make a phone call to the company. I was assured that the booklet I had was a pre-production version from the very earliest boards. Mr. Menz states that the new manual is more complete.

To test the board, I replaced the memory board in my computer with the 4N1 board and let it go to work immediately. I used the serial port to operate my PC-Mouse for several days, then I used it with my modem for a busy BBS weekend. In both cases, it performed flawlessly. There were no conflicts apparent with the operation of a third-party hard disk drive nor with another option board I have installed.

All in all, I can heartily recommend consideration of the Micro Mainframe board to anyone considering adding features to their Tandy 1000. By adding 640K of memory, a DMA chip, a serial port and the optional clock and/or DigiMouse port using only one slot, you will find you have two empty slots to be filled with whatever goodies you can dream up. Mark Menz of Micro Mainframe also mentioned that additional options for the board would be available; perhaps by the time you are reading this review.

(Micro Mainframe, 11285-E Sunrise Gold Circle, Rancho Cordova, CA 95670, 916-635-3997, \$299.95)

— Leonard Hyre

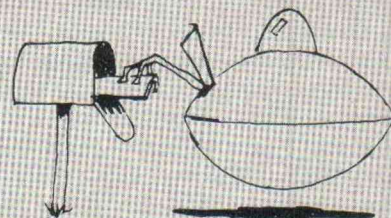
Software

1000/1200/2000/3000

BDL Roast: Just What the Cook Ordered

BDL Roast is a simple straightforward program which can be described as well-done. The documentation is rare in its approach to computerese. In other words, I found no beef with Bette Laswell's programming.

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Seriously, I must admit there was an error on the particular disk which I reviewed and it would not fully generate the files needed for an auto-start, but I was able to operate under MS-DOS on my Tandy 1000.

The BDL Homewares series was designed for pure IBM machines, but run well on the Tandys. The documentation has to be translated from side-by-side drives to the up- and down-configuration common to Tandy.

Ms. Laswell has a long background of computer programming, and an appreciation of the word personal in personal computer. She has therefore, programmed a series of applications which are handy around the home, and make the PC something more than a glorified toy.

BDL Roast is just what the cook ordered. As one of the cooks in this household, I appreciated *BDL Roast* as soon as I had it cooking . . . er, going. *Roast* is menu-oriented and very quick and simple. You tell the program what you want to cook and when you want to serve, and the computer tells you when to put the meat in the oven and at what temperature you should set the oven.

Reviewers must suffer all kinds of privation to test a program to the limit of endurance, so we ran the test on a rump roast which was to be medium by 7:33 p.m. *Roast* said to put the beef in the oven at 4:11 p.m. I did, and the meat was just right. (The potatoes were great and the broccoli au-gratin was a work of art.)

Essentially, you choose the type of meat; Beef, Lamb, Pork/Ham, Veal, Chicken, Duck, Goose, or Turkey, and tell how much it weighs. You then indicate the degree of doneness you desire and the time you want to take the meat out of the oven. The program then tells you when you must put the meat in and what the oven temperature should be.

BDL Roast is a useful program. I wish I could think of a way to make it resident in a good cookbook database. It does exactly what the author intended it to — it brings handy purposefulness to the home computer.

(BDL Homewares, 2509 N. Campbell Ave., #328, Tucson, AZ 85719, \$24.95)

— Howard Lee Ball

The Banner Machine — Not Just Another Banner Program

This isn't the simple little banner program frequently found on the local bulletin board. I have one that prints lettering of various sizes, all of which are very odd looking with square corners where they don't belong. *The Banner Machine* is different, it prints nice letters with your choice of fonts, borders, shades, spacing, justification and more. A number of graphics characters are also offered as a special font. You can even build your own font with selected characters from the various fonts included in *The Banner Machine*. It is truly a quality product that would be a nice addition to anyone's supply of software.

The Banner Machine is not copy-protected and includes batch files and instructions for making a backup disk, for installation on a diskette with your system files and for installation on a hard disk. *The Banner Machine* is aimed at individuals, business owners and teachers. Within the limitations of your printer, it produces professional quality signs and banners in a few minutes at minimum expense. Unlike many products that print graphics, *The Banner Machine* allows some control over the quality of print. It takes full advantage of your printer's capabilities.

Fourteen different IBM PC compatible computers with 256K of memory are supported. This includes the Tandy MS-DOS machines. Several types of printers are also supported, including the Radio Shack DMP-430, DMP-2100P, DMP-2200 and DMP-130. Printer models made by IBM, Epson, Gemini, Okidata and others are supported. Narrow paper of 8½ inches can have up to eight lines, and wide paper of 14 inches can have up to 14 lines.

You have the choice of normal or reverse print (similar to inverse video). Bold (double-strike) can be specified. Shading can be selected from 20 different patterns, which can be placed in the background or foreground.

The print features also include op-

tions for printing with stripes and borders. The border can be printed with the right, left or both ends missing. The banner can be printed with sizes set assuming there is a border, but without the border being printed. Special advanced features are available for printing with more than one pass through the printer. Some of these special features require a small pencil mark on the paper so it can be started at the same place for the multiple passes through the printer. There are several examples in the manual with step-by-step instructions for using the advanced features with different printer ribbon colors.

Banners can be saved to, loaded from, or deleted from a disk. A group of banners can even be chained together to be printed as a group.

Several layout choices are offered. Left-justified, right-justified, centered, even margins and tab are pretty standard for word processing. However, I didn't really expect to see all of this in a banner program. In addition to these features, *The Banner Machine* offers inverse and mirror images. Mirror images can be used with special heat transfer ribbons for printing T-shirts.

Inverse means the printing is upside down and backwards. For a two-line banner, the top line can be inverse and the bottom line can be normal. This allows for folding the banner over to have a two-sided sign. These choices are even represented in the text window on the screen so you can see how your banner is programmed.

The Banner Machine also has many font, border, spacing, shading, tone and printing options with the capability to customize the combination of these features. A professional print shop could likely do a better job of printing, but *The Banner Machine* does a fine job with professional-like results using my dot-matrix printer. *The Banner Machine* is more than I expected in banner software and it works very nicely.

The only thing I don't really like is the price. At \$149.95, *The Banner Machine* is a little steep for everyday home use. The price may well be fair considering all the features offered, but I personally like to see software priced low enough for occasional home use. I just can't see many home computer users buying this program for an occasional "Happy Birthday" banner. However, I expect a

school or small business would quickly get their money's worth from *The Banner Machine*.

(Cardinal Software, 14840 Build America Drive, Woodbridge, VA 22191, 703-491-6494, \$149.95)

— Robert Jensen

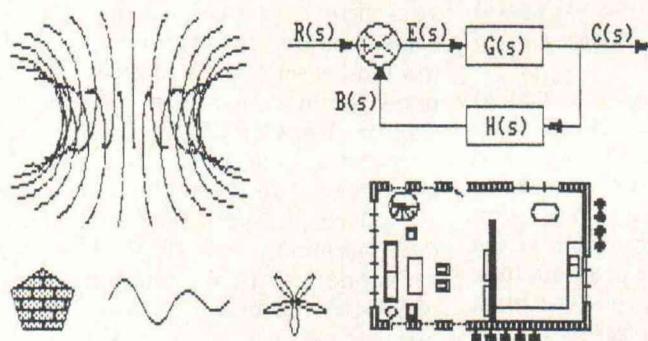
Software 1000/1200/3000

Odds Calculator — One Step Beyond Lady Luck

If anyone who has ever played Poker has thought about it, they know it is a game of mathematical odds. The higher hands are harder to obtain and they are worth more. The skilled player can analyze the cards he has been dealt and determine what cards to discard to go for the best hand. This is done mostly

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by "gut" feeling. After playing for a while, Poker players just know what is best — or at least they think they do. Many nickles and dimes have crossed the card table as a result of experienced players going for the "sure thing."

You can deal 2,598,960 different five-card hands from a deck of 52 cards. The transition from a hack player to a winner occurs when one can determine the odds of every Poker hand and how

cific hand after making a discard. It uses the mathematical crunching capabilities of the Tandy computers well. Trying to figure the complex calculations any other way would be extremely difficult.

As your computer would most likely not be welcome as your partner at a card table, the purpose of the program is to train you to recognize the odds of getting a particular hand, how to discard to take advantage of a particular hand and, finally, how to bet.

The program was written for the game of Draw Poker. It assumes you have been dealt five cards. You first enter the designation for each of the five cards you drew, then enter the cards you wish to discard. After checking for input errors, the odds for each Poker hand that could be made from your draw and discards is displayed. You then have the option of printing this data or changing the cards you discarded. By comparing the odds, you'll know if the proper discard is made.

This number crunching requires considerable time. Remember, there are over 2.5 million possible hands in those 52 cards. The running time for discarding three cards is 15 seconds, while it takes 25 minutes to calculate the odds of discarding five cards. While this seems like a long time, be happy we don't have Apple computers. The calculation time for the Apple version discarding five cards is one *day*.

By running the program and comparing the odds calculated against your guesses, you will know what to do when playing without your transistorized buddy at your side.

The cost of this Poker coach is moderate compared to losing in a serious Draw Poker game. With printed documentation, it's \$25.

(Robert A. Nicolai, 4038 N. Ninth Street, St. Louis, MO 63147, 1-800-642-6524)

— Bruce Rothermel

"... the purpose of the program is to train you to recognize the odds of getting a particular hand ..."

much to bet. Lady Luck is too fickle to count on all the time. In the final analysis, it is cunning, preparation and personal evaluation of other players that wins Poker pots.

To assist in evaluating Poker hands, Cheapware (Robert Nicolai) has released a program for MS-DOS computers named *Odds Calculator for Draw Poker*. What this program is can be best described by explaining what the program is not. It is *not* an arcade-type game where you play a hand of poker against the computer. This is a course in the mathematical probability known as "combinatronics" as applied to the game of Poker. The course consists of a booklet and a program disk.

The booklet is sectioned into chapters leading the novice in mathematical probability from the assumption that they have no knowledge through explaining how to place your bets to take advantage of the odds.

The first two chapters cover the meaning and the elementary principles of mathematical probability. While they are quite droll and require a lot of concentration to understand, the purpose is to instruct the user that Poker is not a game of chance, but a game of odds. Using these odds in your favor results in winning. Nicolai is not a statistician nor does he pretend to be one. However, the elementary facts of how the odds in Poker can, and will, work for you are thoroughly presented.

The booklet then leads you into how to place your bets and how to use the program. The computer-based program is essentially an odds calculator that determines the odds for getting a spe-

Accessory 1000/1200/2000/3000

MouseTop — A Furry Companion for Your PC

Remember the ads for *Jaws II* — "Just when you thought it was safe to go back in the water?"

Well, just when you think you've seen everything, it always comes along. And here it is: The MouseTop mouse cover.

You don't need this little cover that fits right over your computer mouse. Oh, certainly, it keeps the grime, dust and grit off the mouse. But I have honestly seen darn few people use keyboard, disk drive and (for that matter) typewriter covers. Too much trouble.

Those things don't have something that the MouseTop does — it's cute.

"What's that?" someone asked a few minutes after it arrived. "It's a mouse cover," I said. "It keeps my mouse clean and warm."

"It's *cute*," was the reply. "Really cute. At last, you have something cute to go with all that equipment."

OK. I've bought laser printers, 70-Meg hard drives, jazzy plotters and every computer Tandy's made in the

past five years. Nothing has brought as much comment as this little MouseTop.

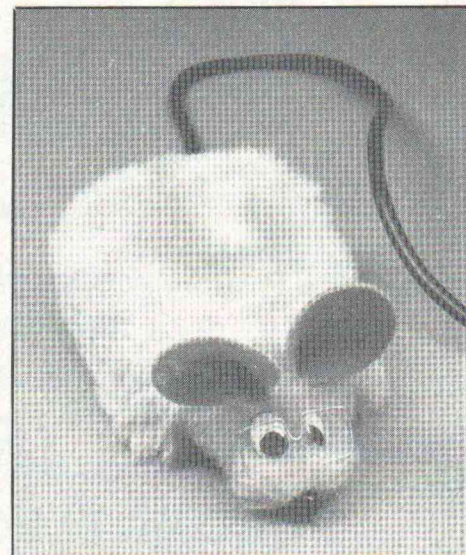
It is cute. Two ears, glasses and a shiny black nose. It fits right over my computer's mouse. The "tail" is the mouse cord.

Each MouseTop is hand-made, which makes each unique. And it is machine washable.

I like this little varmint and I think you'll like it, too. It does add a touch of furry personality to your computer.

(H&H Enterprises, P.O. Box 2672, Corona, CA 91718, 714-737-1376, \$5.95, 20/20 vision model [without glasses] \$5.49)

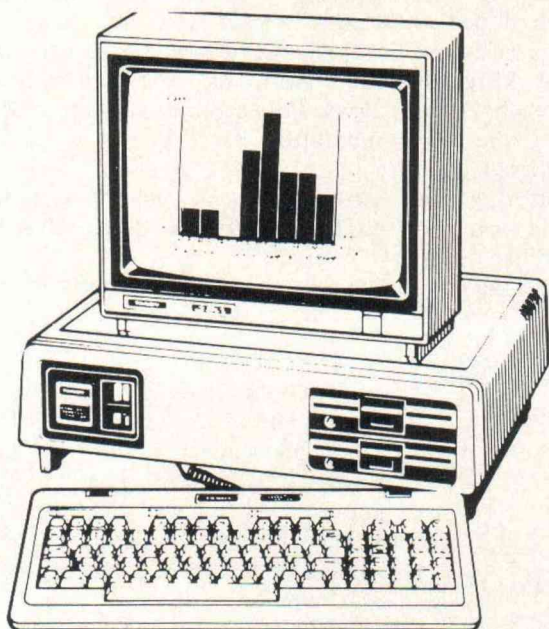
— Lonnie Falk



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Zuckerboard: High Power, Low Price

When you first purchased your Tandy 1000, it's a good bet you decided to hold off on adding more memory, hoping you could better afford it sometime in the future. The 1000 is an excellent buy by itself, but Tandy's prices on their memory boards are still pretty steep.

The Tandy 1000 comes with 128K of standard memory on the motherboard. If you purchase the Tandy Memory Plus expansion board with 256K, it will set you back \$319.95; with 512K, \$519.90 — darn near half again what you paid for the whole machine. Add their clock option and you're out another \$100 (though a mouse controller is included).

Why does the additional memory cost so much? We all hear every day how much prices for 256K DRAM chips have plummeted.

Well, the fact is, it *shouldn't* cost so much. And the Zuckerboard is a high-quality, reliable alternative to the high prices of Tandy's expansion memory boards.

Check these prices with the one above: The Zuckerboard with 256K costs \$109; with 512K, it's \$149; and the clock/calendar option is \$39.

Significant savings, right? Memory is memory — as long as it's reliable — so price and warranty are the main considerations. The Zuckerboard comes out ahead on both counts, with a two-year guarantee compared to Tandy's 90 days. But in fairness to Tandy, part of what you pay for is good, readily available service. In case you have a problem, there is a lot to be said for the value of having a Tandy service center right across town.

The Zuckerboard I installed was the 512K configuration. With the stock 128K on the motherboard, this pushes the 1000 up to 640K of RAM. The clock/calendar unit was included, already seated in its socket on the board.

Installation is a snap: you just remove the two screws on the front of the machine, slide off the cover and remove

the screw and metal bracket from any of the three expansion slots. Then you plug the board into the slot and secure it with the screw you removed. Brief, easy-to-follow instructions are included — anything more complex would be overkill because the installation is *really* a simple process.

“... the Zuckerboard is a high-quality, reliable alternative to the high prices of Tandy's expansion memory boards.”

When you're finished, all you need to do to test the installation is power up and watch the memory check in ROM display the grand number — 640K. From there on, you know you're traveling in style.

If you choose the clock/calendar option, it's nice to know you don't have to sacrifice another of those valuable

expansion slots, as you do with the Tandy Digi-Mouse/Calendar board. The clock contains two batteries with a life expectancy of 20 years and is guaranteed to be accurate to within two minutes a year for 10 years. The software controlling the clock is supplied: one program to set it and another for inclusion in your AUTOEXEC file to read the clock each time the machine is turned on or reset.

Believe me, even if you've never encountered a time when 128K was a limitation, sooner or later you will. Many programs now require 256K or more to even begin execution — let alone room to function at an optimal level. When you have enough memory to set up a large RAM disk, every disk-access intensive application you use can be speeded up tremendously. And with a clock/calendar installed, you can forget about that ridiculous requirement of having to look at your watch and enter the information by hand every time you reset your computer.

Power, good design, easy installation and a very low price: For all this, the Zuckerboard is an excellent choice.

(Advanced Transducer Devices, Inc., 1287 Lawrence Station Road, Sunnyvale, CA 94089; 256K, \$109; 512K, \$149; clock/calendar option, \$39)

— Kevin Nickols

Software Review . . .

SmartNotes Stick with Your Application

Everywhere I look I see people using those “Post-It” notes by 3M Company, the little (usually yellow) pieces of message paper with adhesive strip that stick to (and peel off of) just about anything. When the history of office communications is written, I suspect Post-It notes will go down with the invention of the QWERTY keyboard and the dictating machine as revolutionary products. Indeed, almost every piece of paper I get in my office has a Post-It note attached.

The trouble is that this only works

when you have something onto which the Post-It note can be stuck. And, as one who uses a computer most of the time for writing, note-taking, appointment-making and the like, Post-It notes are just no help.

Enter *SmartNotes* from Personics Corporation, which runs on IBM-compatible systems.

SmartNotes is like Post-It notes for a computer. With this program, you can “attach” notes electronically to just about anything on your computer's screen and, thus, flag it for attention later on.

Take, for example, a letter you have written. It's a letter you can use over again, if you only change a few things here and there — references to a location, a certain product and so on. It is too much trouble to set it up as a mail merge-type document, but you just might mess up if you don't know where all the various pieces of information are buried. *SmartNotes*, which is a memory resident program, is very much like a

pad of Post-It notes sitting by your side. All you do is press a key combination and, lo and behold, you can "stick" a note anywhere on the screen. Then, next time you go to that letter, all you have to do is call up the notes you made in the first place and make the changes you need. Presto!

One of the nice things about having a Tandy 3000 with a 20-megabyte hard drive is that there is a lot of storage space. Add a 10-megabyte disk cartridge system, as I have, and you've got a heck of a lot of storage space. You also seem to end up with a lot of files and directories that you don't know anything about! Thanks to *SmartNotes*, you can attach notes to the directories (or anything in DOS for that matter) just the same as you can attach them to, say, letters in an application. Now my computer has a neat notated list of directories that tells me just what is where: no more confusion!

The really nice thing is that you can set up notes with just a couple of key-strokes. You also have a lot of options as well, such as changing the size or color of notes, hiding notes, moving notes around the screen and changing

the "context" of a note.

SmartNotes does not change your application's file, but, instead, writes a separate file for the notes themselves. Each note then is "attached" to a place in your application based on the "context" of the place to which the note is to be pasted. There is a default for this, and you can usually leave it alone. But, as in the aforementioned example, with a DOS directory, the context would be so long that it would cover several lines. If you sorted the directory, the "context" would be wrong and the note would not appear. So, you edit the context.

You can also page through an application (such as a letter in a word processor) using the page up/down keys and *SmartNotes* only stops when a note appears on the screen. If no notes are found, you are returned directly to your application.

Several utilities are included to list and print notes, open files and the like. Overall, *SmartNotes* has neat and well-thought out design and structure.

There is also a special mode for attaching notes to spreadsheet cells. This is important because, after all,

spreadsheets were designed to be recalculated. When you recalculate, however, the "context" changes if you are using the straight text method of attachment used by other applications. Therefore, *SmartNotes* has a different way to do things, and this is a big advantage, too, because it allows you to recalculate, move, reformat and change ranges in a spreadsheet and keep all the notes in the right place.

SmartNotes is memory resident but does not, as far as I have been able to test, conflict with other memory resident programs — about four of which I use together. An important consideration is that it does not seem to care whether it is loaded first, last or in between — making it possible to accede to the requirements of more finicky utilities.

The manual is well-written and uses clear and ample graphics. I recommend this program very highly.

(Personics Corporation, 2352 Main Street, Building Two, Concord, MA 01742, 800-445-3311, \$79.95)

— Lonnie Falk

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Compare This Routine to Your Present Language, and See the Difference

```
RD  READ "NAME: ",NAM,! QUIT:NAM=""
    IF NAM'?'2.A1","1A.E WRITE "PLEASE ENTER AS LAST, FIRST MI",! GO RD
TEL  READ "TEL # ",TEL,! IF TEL'?'3N1"--4N WRITE "NNN-NNNN PLEASE",! GO TEL
    SET ^DATA(NAM)=TEL GO RD
PRT  WRITE "    NAME",?20,"TELEPHONE #",! SET NAM=""
LP   SET NAM=$ORDER(^DATA(NAM)) QUIT:NAM="" WRITE NAM,?20,^DATA(NAM),! GO LP
```

This simple program accepts, screens and saves names and phone numbers. . . sorts and prints them. These six lines of code are an example of the extremely compact, and familiar nature of COMP Computing Standard **MUMPS**, the Database Language. In lines 1 and 2, READ, IF, WRITE and GO should be easy to follow. The pattern match operator "?" filters for the correct input of alpha characters to make a name. In line 4, SET ^DATA creates a permanent global file, with NAM as a subscript. The data node is SET to the telephone number. In line 6, the \$ORDER command gets the next subscript in order, from the ^DATA file, thereby SETting NAM to the next name in the file.

CCSM, the Database Language, frees you from the tyranny of typed and restrictive languages. NO declarations of variables or data files. Look at these Features:

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KeyEntry III Replaces Keypunch Machines

KeyEntry III is a program that lets companies take advantage of the large number of PCs available to do the data entry jobs previously done by keypunch or key-tape machines.

KeyEntry III performs the task of making a personal computer into a data entry station, suitable for the most demanding data entry jobs. The adaptation of the small computer to this task means the same machine that is used for general business purposes in the daytime can be used for data entry at night,

These and other options (such as setting up for use of the European standard AZERTY keyboard) are user changeable, and the software even activates a numeric keypad in the keyboard's alphabetic portion to simulate a keypunch-type keyboard if desired, or emulate an IBM 3741 data entry machine keyboard.

After the keyboard, the most important aspect of the environment is the "form" in which the data is entered. This form is what appears on the screen for the operator's reference and is the framework for all data entry. *KeyEntry III* provides up to 32 record formats within each job.

Since *KeyEntry III* is primarily designed for rapid, continuous entry of similar data, the forms the user creates can include a number of tests that sound a warning if the entered data couldn't possibly be correct; for example, if numbers get into the "name" area, or too many numbers are entered into the "date" field.

"... the forms the user creates can include a number of tests that sound a warning if the entered data couldn't possibly be correct ..."

when much of this work is done (entering the day's accumulated data). It also means the inexpensive, quiet, reliable personal computer can replace the old keypunch and (nearly as old) key-tape machines.

The most obvious example is the numeric keypad to the right side of your keyboard. Data entry personnel have years of experience with entry pads and a non-standard pad is difficult to work with. Unfortunately, the arrangement on computer keyboards with the '7', '8' and '9' keys along the top is not the standard that many data entry machines use.

This is where *KeyEntry III* comes into the picture: one of its functions switches '7', '8' and '9' with '1', '2' and '3' and moves the zero to the NUM LOCK key. The program also automatically "locks" the keypad to the numeric function and places a lot of standard function keys around the keypad.

One thing of prime importance in entering data is accuracy. The time-honored method of verifying correct entry is for either the same operator or another to re-enter the data while it is checked against the original entry. *KeyEntry III* performs this task with an option of locking the keyboard each time an exception is found in the entered data until the error is acknowledged by the operator.

When verification of a job is interrupted for any reason, the operator can ask the program to indicate the next information due to be verified. *KeyEntry III* performs this and other search functions to facilitate operator efficiency.

The on-screen format for data entry may be explicitly specified for each job, including field length from one to 77 and the type of characters acceptable in each data field.

KeyEntry III also permits various

checks to be made on the entered data, such as testing a date for numbers outside possible correct values and many other user-specifiable tests. The setup may also specify certain fields as non-skippable — the operator can't bypass specified fields by pressing ENTER without data.

Various "duplication" methods can be specified for the data fields to speed up entering identical or similar data.

An alternative to the usual two-pass verification mentioned above is the reverse entry method that can be specified with this program. In this method, the program will not accept data entered into specified critical fields until they have been entered once in the regular manner and immediately re-entered in the reverse order. This method of verification is especially useful in speeding up entry when a lot of data is being entered but only a small portion of the data is critical.

One of the more useful methods of testing for correct data is to set up a table and accept only data that matches what is in the table (or doesn't match). If you have a number of warehouses, each with a different code, the simplest method of ensuring a correct entry for that field is to build a table of the valid codes and specify entries in the field must match a valid code located in the table. This is easy to do with *KeyEntry III*, and the table of two-letter state postal codes is already built into the program.

Since this software is designed to transfer data from paper to standard machine-usable format, it would be of little use if it could only record data in the standard ASCII format used by MS-DOS machines. Much "data crunching" is still done by the large mainframe computers, and *KeyEntry III* provides an option to store data in IBM's EBCDIC, which is the standard used by most mainframe computers.

There are a number of other features contained in *KeyEntry III* (too many to list in a review). They all are designed to make data entry fast and accurate and are a great advance over the old keypunch machines where you could only enter the data and re-enter it in a two-pass verify with no other method of machine testing for its correctness.

KeyEntry III also keeps a complete file of operator statistics to help management monitor operator efficiency.

Although the program I received worked flawlessly, there are some cur-

ious oversights for a program in this price range. In one of the demonstration programs, "numeric only" was spelled "nwmgric!ooly)" — a rather curious lapse for a program intended to speed *precise* data entry. A number of other careless entries were also found.

A far more disturbing problem became obvious when I tried to read the documentation. There are many pages out of order and even more completely missing. I called SCS and they informed me there had been some trouble with their printer, but the problem had been corrected. They immediately shipped me a new package with a later version of the program.

The new package also had a number of pages missing from the documentation. I again called SCS and they forwarded the missing pages. SCS is aware of this documentation problem and assured me they are correcting it as quickly as possible.

(Southern Computer Systems, Inc., 2732 Seventh Ave. South, Birmingham, AL 35233, phone order 800-533-6879, \$895, \$35 for a working demo package)

— John McCormick

Software

1000/1200/3000

Timeslips — Because Time is Money

If you've ever had the dubious pleasure of paying an attorney or consultant for their services by the hour, you know the true meaning of the cliché "Time is Money." And for those professionals, consultants, engineers, lawyers who bill their services by the hour, inaccurate recording of their time and other billable expenditures may result in a loss of money.

Without accurate records and an accurate way of tracking projects and staff involvement, it is difficult to determine which projects are generating income, which are profitable, and where each employee's time is dedicated.

Inaccurate billing also causes lost

credibility with the client. For the professionals for whom "Time is Money," accurate management and tracking of time is critical.

To aid those professionals there is *Timeslips* from North Edge Software.

Timeslips allows users to track their time and expenses with "pop-up" (memory-resident) stopwatch screens, or enter time and expense information from their records; prepare customized bills with user-definable billing phrases and aged receivables; and generate several types of business reports and graphs.

When *Timeslips* is used as a memory-resident program, it pops up over other programs at the touch of a user-definable key. This lets users access *Timeslips* (to time a phone call, for example) and then resume their work (word processing, financial analysis, etc.) at exactly the point they left it.

Timeslips can track up to 240 users or operations simultaneously and keep up to 32,000 individual time or expense records per directory. The number of directories is limited only by disk space.

On each "timeslip" — the actual on-screen, automated time record — users

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can specify billing rates, project description, projected completion time, reference code, date and time. Users may customize the headings on the timeslips to fit their profession or application.

In addition to tracking time expenditures, *Timeslips* allows the user to track expenses by each project and rebill, if appropriate, these expenses to the client.

Individual timeslips can be grouped together by project, client or any other criteria to generate appropriate billings.

When generating a bill, *Timeslips* lets the user format custom billings from the data contained on the timeslips. Any data shown on the bill can be specified.

In order to determine if their business is running efficiently, if they are spending more time on flat fee work than the flat fee justifies, if their hourly rate covers overhead and leaves enough to earn a living, if they are going over budget on a project, or if their highest paid employee brings in the most revenue — *Timeslips* produces several reports and graphs that may be sent to a screen, printer, disk file (in ASCII

Since it's not practical to carry your MS-DOS computer with you as you travel, *Timeslips* contains a nifty low-tech way to note your activity and expenditures until you return to your computer. Little timeslips that replicate your *Timeslips* data entry screen are provided on preprinted 3M Post-It-type sheets.

There's good and not-so-good news regarding operating *Timeslips*. The good news is that North Edge Software has listened to the early users of the first release of the program and has revised the program to allow it to be applicable to many professions. The screens and reports can be customized to reflect the terminology and reporting needs of the user. The flexibility and adaptability of *Timeslips* is impressive, which brings up the not-so-good news.

It takes awhile to familiarize yourself with the system and to customize the program by loading your company, customer and billing data and formatting the reports and invoices to meet your needs. This is now complicated by the current situation where the instruc-

If you bill for your time and are manually tracking your business' time and material expenditures, the payback for *Timeslips* will be virtually instantaneous.

(North Edge Software, P.O. box 286, Hamilton, MA 01936, 617-468-7358, \$99.95)

— Bruce Rothermel

Software 1000/1200/3000

Wishbringer — A Clever and Challenging Interactive Fiction

I'd like for people to know I don't go around saving beautiful princesses all the time, though I must admit it makes an interesting change of pace from my normal daily routine.

Unlike many other Adventure games concerning medieval quests, *Wishbringer* started me in modern times as a lowly postman working for the oppressive post master of the town of Festeron. My latest assignment is to deliver an important letter to the Magick Shoppe far outside of town. My boss, Mr. Crisp, informs me (in his most condescending tone) that should this piece of mail not reach its destination by 5 p.m., my life expectancy will shorten drastically. (He actually uses much harsher language.)

I know about the old adage "Neither rain nor snow nor sleet nor gloom of night . . .", but no one should have to go up against the town librarian's deranged poodle! However, with a little resourcefulness, I outwitted the ferocious little canine. All the rest of the long way to the Magick Shoppe, I explored the surrounding countryside, much to the consternation of Mr. Crisp, who could evidently detect my goofing off from miles away! He also had very clever ways of conveying his displeasure to me regardless of how far away I was.

Reaching the Magick Shoppe well within the allotted time, I found out the significance of the letter which was my charge. I was unsure about whether I liked the store's strange proprietor or the mysterious gift she offered me.

As weird as the aforementioned hap-

"If you bill for your time and are manually tracking your business' time and material expenditures, the payback for *Timeslips* will be virtually instantaneous."

image format), or spreadsheet or database programs (such as *Lotus 1-2-3* or *dBase III*). These reports and graphs include:

- Detail Report — Details the entire content of each timeslip selected including subtotals and grand totals.

- Summary Report — Four types: user totals, account totals, activity totals and account balance summary with aging.

- Graphics — Bar graphs and pie charts with up to eight levels of information.

- Client Billing Worksheet — summarizes new activity, unbilled timeslips and expenses, unposted payments, aging history and most recent bill date and balance.

- Client List — Alphabetically sorted by name with address, phone number and client number.

- IRS Report — Helps justify a computer as a business expense by keeping a log of business usage.

tions for the new version (2.1) are contained on a README file on one of the disks. It is necessary to go back and forth between the original documentation and the 21 pages printed by the upgrade. However, North Edge has assured me the new manual will be released by the time this review is published.

On-screen help is available at any time to the user, and prompts help the user to determine the various options available. If the registered user is still having difficulty, North Edge has free telephone customer assistance available. Once the user has familiarized himself with the program, loaded it with his data and customized *Timeslips* to his needs, operation is quite easy.

The overall quality of the program is excellent. Since this program retails for only \$99.95 and has the operating appearance of some of the more expensive business programs, making the decision to purchase *Timeslips* is easy.

penings were, even stranger encounters lie within the wonderfully exciting and funny world of *Wishbringer*. Not the least of which was a transition from the modern world to the days of old and the dangers which awaited therein. Of course, there was also a quest to be won — it wouldn't be an Adventure game otherwise.

Though this is a totally-text Adventure with no graphics, it is one of the most thoroughly enjoyable pieces of interactive fiction I've come across. The smoothness with which the plot unfolds, the vivid descriptions, challenging obstacles and clever humor make *Wishbringer* a fun diversion which can entertain both young and old for many evenings.

(Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140 617-492-1031, \$39.95)

— Rick Boozer

Software 1000/1200/3000

Media Master Plus Helps Bridge the MS-DOS CP/M Compatibility Gap

I bet everyone wishes they could "master the media." Just think, your name in lights, newspaper, television, radio. As I opened the package I had received in the mail earlier, I imagined I would find a book and maybe a cassette tape called *Media Master* which would lead me to instant stardom. Instead, I found a software package *Media Master Plus* by Intersecting Concepts encased in a nice plastic portfolio containing a 62-page manual and a single diskette. Oh well, stardom must wait.

Media Master Plus is a disk-to-disk format conversion utility. The "Plus" portion adds an interesting module called *ZP/EM* from Livingston Logic Labs. This module allows you to emulate Digital Research's CP/M operating system on your MS-DOS computer.

Media Master comes in several ver-

sions for different "host" computers. I reviewed the version for the IBM-PC and compatibles. System requirements are 192K (256K on a Tandy 1000), one floppy drive and another floppy, a hard disk or a RAM disk with at least 128K. A printer is optional.

The program comes set up for two 48-TPI double-sided drives. You may select up to 16 physical drives and assign them any logical drive letter. The drives may be set up as 48- or 96-TPI, single- or

double-sided, high-density, or system drives. A system drive is a hard disk or a RAM disk.

The program is completely menu-driven and the manual is rarely needed. *Media Master Plus* uses a filespec convention identical to that of MS-DOS and wild card characters are allowed.

You might find yourself asking why a program like *Media Master Plus* is even needed. It serves three purposes:

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transfer of files between MS-DOS disks and any of approximately 140 other CP/M disk formats; transfer of files from one CP/M format to another using the host computer; and CP/M emulation on the host computer.

You may use programs such as *WordStar* and *dBase II* on MS-DOS and CP/M machines and easily transport your data from one to the other.

CP/M has been around for years and is considered by many as the defacto standard eight-bit 8080/Z-80 operating system. Programs that run under CP/M are easily transported from one CP/M machine to another just as MS-DOS — almost. Although the operating system is standard, the disk format is not. Only 8-inch CP/M disks can be read on any CP/M computer using 8-inch drives. The smaller 5¼-inch formats were left scattered to the wind. Thus, the 140 possible choices. *Media Master Plus* now allows you to move the software you need to your own disk format.

Media Master Plus allows you to emulate an eight-bit CP/M environment on your 16-bit 8088 computer. This allows you to run a host of CP/M software on your Tandy 1000 as in my case. You no longer have to throw away your old software when you upgrade to a 16-bit computer.

Media Master Plus contains its own command line processor and batch file operation mode. The command line processor lets you start the program and specify your menu choices in one step. An example would be MM 2ba)NB ENTER. This starts up the program, selects Option 2 to format a disk in Drive B using Selection A from the first format option menu.

Included on the *Media Master Plus* diskette are four files used to emulate the CP/M operating system. They are identical except for the terminal emulations they perform. One contains no special terminal emulation while the other three are for a Zenith H19, an Osborne and a Kaypro terminal.

The emulation package will apparently run most CP/M software. The following types of programs can, in general, be run under ZP/EM:

- Non-system utilities: assemblers, editors, compilers, interpreters and applications programs.
 - Games — most BASIC and compiled BASIC
- The following cannot run under ZP/EM:

- System- or hardware-dependent utilities: DUMP, MOVCPM, SYS and directory utilities.
- Programs that directly access or modify any BIOS data tables, the BDOS or CCP.
- Programs that set up their own console interrupt handlers, clock interrupt handlers, etc.
- Programs that use Z-80 opcodes. ZP/EM currently supports only 8080 opcodes.

In order to test all these features I enlisted the help of a friend and his trusty Tandy Model 4P. Armed with this, Radio Shack's *CP/M Plus*, Montezuma Micro's CP/M and a version of *WordStar* for CP/M, I embarked on my perilous tests.

First, I logged in a couple of disks and read their directories. This worked without fail in standard CP/M format. Next I formatted a CP/M disk and copied an old MS-DOS *WordStar* file onto this newly created disk. My friend was able to read this file using his CP/M *WordStar* with no problem. The last

thing I did with these disks was to move files back and forth between the two different CP/M formats. This worked perfectly.

Now, the ultimate test. Can I run CP/M software on my Tandy 1000? First I attempted to run *WordStar*. This was my first failure. Apparently, the version of *WordStar* we were using was written using Z-80 opcodes because I received an "invalid or Z-80 opcode encountered" error. After that I tried running the standard editor (ED) and assembler (ASM) modules of CP/M and they ran fine.

Media Master Plus, by Intersecting Concepts, is an ideal package for people having access to both MS-DOS and CP/M computers. It is extremely versatile and the emulation package is worth looking into. The cost of this package is quite trivial compared to its many benefits.

(Intersecting Concepts, 4573 Heatherglen Ct., Moorpark, CA 93021, \$59.95)

— Larry Birkenfeld

Book

1-Hour Telecomputing — A Crash Course in Communications

Telecomputing is using your computer and a modem to communicate with other computers via the phone line. *1-Hour Telecomputing* is a novice-level book designed to be read in about an hour and is subtitled *A Crash Course in "On-Line" Computer Communications*. This book is for those who know nothing about telecomputing and want to find out about it quickly. It is concise, clear, covers the essentials, and contains only five chapters and four appendices. Do not let its size mislead you into thinking it's not worth reading. This book contains a lot of valuable information even for seasoned veterans.

The first chapter covers what you can do with your computer over the phone and includes a very good overview of the vast number of available services,

such as databases, shopping, banking and local bulletin boards. This introduction also covers what you need to get started: a modem, interface card, cables, software, etc.

Chapter Two contains one of the best explanations of serial communications I have come across in the three years I have been using telecommunications technology. Here you will find everything you need to know about parity, stop bits, duplex and all those other technical terms associated with telecomputing. After reading this chapter, I felt more at home with these terms associated with the use of modems, telephones and computers.

The next chapter is the next logical step past serial communications — the modem. This chapter clearly explains what a modem does and all the myriad of features available such as auto-dial, auto-answer, Baud rates and acoustical versus direct-connect. The chapter ends with sound recommendations on choosing the modem that is right for your own application.

What good is a modem without software to control it? Chapter Four contains the answer and much more on what role software plays and how it can be used. Many more telecomputing terms are explained, such as uploading, downloading, XMODEM and ASCII

codes. The authors again give sound advice concerning choosing the right software for your needs and the differences between the countless types of communications programs available. While this chapter does not recommend a specific product, enough information is given to make an intelligent choice.

The last chapter gives a brief listing of available services and a sampling of names and addresses where more information can be obtained. While not comprehensive, there is enough detail to give the reader a taste of what some of the major services such as CompuServe, Delphi and The Source are all about. One of the appendices contains a more complete listing of services available, where to contact them and the cost. The chapter ends with some useful tips to remember when using some of these services.

The four appendices contain a glossary of terms, ASCII codes, the DB-25 connector and its pin functions and listing of telecomputing resources. These appendices complement the rest of the book very nicely and serve as a reference for later use.

Overall, this book contains all the

information needed to get started with telecomputing. The only regret I have is the price tag of \$19.95. The book is 198 pages and not much larger than the popular paperback novels. It looks as if it was written and printed on a home computer and contains no photos and very few drawings or illustrations. Visually, it is not too appealing, but it is well-organized with a great index and table of contents.

As an avid reader of computer books,

this one is a bit over-priced for me. But, if you want to learn about telecomputing quickly and can spare the cash, *1-Hour Telecomputing* can get you started.

(Authors: Roger C. Alford, Robert Retelle and Thomas Wnorowski. Published by IM-Press, 1412 Rosewood, Ann Arbor, MI 48104, \$19.95)

— Tim Birtcher

Software

100/200

X-TEL Adds XMODEM Communication to Tandy 100/200

Sigea Systems has developed a terrific communications package for Tandy Models 100 and 200. *X-TEL* works as a stand-alone package, or as

a sidekick to Telcom or Sigea's MS-DOS program, *Telecommuter*. *X-TEL* allows uploading and downloading of files using XMODEM protocol and adds some simple text editing functions.

In addition to document (.DD) files, *X-TEL* transfers BASIC language files (.BA) and machine language programs (.CO). Spreadsheet files and other special data files that are equivalent to .CO files can also be transferred.

Although the program uses only 2,800 bytes, a system with 16K minimum RAM is recommended. The software comes on cassette and on a floppy disk, and can be downloaded to the Tandy 100 or 200 by either method.

Submitting Material To PCM

Contributions to PCM are welcome from everyone. We like to run a variety of programs that will be useful/helpful/fun for other Tandy Portable and MS-DOS computer owners. We now support the Tandy portable models 100, 200 and 600 and the Tandy 1000, 1200, 2000 and 3000 MS-DOS computers.

Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

Pay for submissions is based on a number of criteria. The rate of remuneration will be established and agreed upon prior to publication.

For the benefit of those who wish more detailed information on making submissions, please send an SASE to: Submissions Editor, PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

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HIP-POCKET HELPERS

()

The ALPS Hip-Pocket Helpers is a collection of powerful and easy to use utility programs. They include a slick Directory Tree, a sorted 5-across directory display, a sophisticated keyboard substitution aid (only 5K of RAM), utilities to search through ALL directories for file names or even strings within a file, and much, much more, 29 utilities in all. Call or write for info. Price and performance you can't find elsewhere.

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X-TEL reserves 2.7K RAM in addition to the space occupied by the two program files, since this space is needed only during program execution. Because *X-TEL* occupies a non-relocatable portion of high memory, it can be used in conjunction with other low-memory machine language programs.

One of the problems I have with my Tandy 100 is saving machine language (.CD) files. The BASIC and text files can be transferred between the 100 and my desktop computer, but certain machine language files must be saved on tape. With *X-TEL*, the need to save programs on cassette tape is history since any file can now be transferred to a disk on a desktop computer.

I use my 100 frequently for business trips and consume every bit of the 32K RAM for my programs and notes. If my Model 100 is approaching maximum memory capacity and I want to transfer a BASIC program, sometimes I don't have enough room to translate the file into ASCII and send the file to the hard disk. With *X-TEL*'s XMODEM protocol, I can save the file directly to the remote computer in BASIC language and move it back to the 100 without wasting time and memory converting either file into ASCII.

X-TEL has some useful online features. If you've forgotten the name or extension of a file to upload, a function key combination allows you to see the names of files in RAM. Also shown are the file sizes and amount of free memory. This is very useful if the file to be downloaded is large and you're not certain if there is enough room in the portable to accept the entire file. If more space is needed, another function allows you to delete files.

You even have access to the text editor while online in terminal mode. Characters coming from the remote are held in a 64-character buffer while working in the text mode. The *X-TEL* issues an XOFF after the first 40 characters and, if the software for the remote computer supports XON/XOFF data flow control, no data is lost while editing a file.

Using *X-TEL* on my Model 100 and the "freeware" program *Procomm* on my Tandy 1200, I tried several machine-to-machine transfers. I was very impressed with the speed of transfer and the ability to transfer BASIC and machine language files back and forth with no problem. When *X-TEL* completed

the successful transfer of a file using XMODEM protocol, it beeped to let me know it was ready to download another file.

This is one of the most useful programs I have seen for the Tandy portables, and *X-TEL* certainly eliminates a lot of the frustration I encounter with cassette storage. Now everything transfers quickly and error-free between my laptop and desktop computers.

(Sigea Systems, Inc., 19 Pelham Road, Weston, MA 02193, sales 617-647-1098, applications hotline 617-647-1099, \$50 plus \$5 S/H)

— M.J. Batham

Software 1000/1200/3000

Electric Envelope Aids File Transfer

Finally finished! Now, I will just take my spreadsheet, graph and document and drop them in the old "electronic mail box" and in no time flat they'll go from coast to coast to the home office. What's that? You can't deliver my mail! What happened to that old saying "The mail must go through"? I see, you only accept ASCII numbers from 32 to 127. What is this ASCII stuff anyway? Oh! A special code computers use for transmitting information over data lines. You say I need an envelope, too?

At that very instant an idea was born. What about an "electronic envelope" that could hide my data and fool this stubborn computer mailman into believing he now has a legitimate piece of mail. MCTel to the rescue. Their *Electronic Envelope* software package is made to do just that.

Electronic Envelope is so simple to use it requires no instruction manual. You get a disk and a postcard-size set of instructions containing an explanation of the program's two commands, Insert and Remove, plus a note that you can type Help to receive additional instructions from the four document files contained on the disk. Believe me, this is more than sufficient. If you can breathe, you can use *Electronic Envelope*.

Spreadsheets such as *Lotus 1-2-3* and

Symphony, graphics files, and some word processors such as *WordStar* save data using codes outside the normal printable ASCII range or in binary form. Most electronic mail systems transmit only data within the printable ASCII range and cannot handle these special file formats. This is where *Electronic Envelope* takes over. It encodes binary data and ASCII data outside the printable range to appear as printable ASCII text to electronic mail systems. The XMODEM protocol used by many telecommunications programs works in a similar manner except the data is encoded and decoded in one step as it is transmitted and received at the distant terminal. *Electronic Envelope* encodes the file and it remains that way until someone takes it from their mailbox and "removes" it from the "envelope."

As stated before, *Electronic Envelope* is extremely easy to use. Type Insert and you are prompted for the filename to place into the envelope (encode). You are then asked to provide an output filename to be used for the encoded file. This output file contains its own checksum and is about 40 percent larger than the original file. It can now be left in an electronic mailbox.

The recipient of the encoded file must also have a copy of *Electronic Envelope* to "remove" (decode) the file from the envelope. Typing Remove prompts you again for an input and output filename. Upon removing the file from the envelope, a second checksum is calculated and compared with the original to verify the file was received correctly. The output file created by the Remove command is identical, provided the checksums match.

This completes the mail cycle. Our electronic mailman has been satisfied and our spreadsheet, graphics file and document made it to its destination in one piece and on time. An added benefit of *Electronic Envelope* is confidentiality. The encoding process creates an unintelligible output file. Only another owner of *Electronic Envelope* can remove the file from its envelope in order to read it.

For users of electronic mail systems, whether it be in-house or otherwise, *Electronic Envelope* is a must.

(MCTel, Three Bala Plaza East, Suite 505, Bala Cynwyd, PA 19004, disk \$49.95)

— Larry Birkenfeld

The following products have recently been received by PCM, examined by our magazine staff and approved for the PCM Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be. This month the Seal of Certification has been issued to:

Copy II PC, software-based backup utility. Allows you to back up most copy-protected software. Includes disk drive speed test. Requires Tandy 1000, 1200 or 3000. *Central Point Software Inc., 9700 SW Capitol Highway, Suite 100, Portland, OR 97219, (503) 244-5782, \$39.95 plus \$3 S/H.*

Copy II PC Option Board, replacement disk controller board. Allows you to make exact backups of nearly all copy-protected software, including programs not copiable by software-based utilities. Requires Tandy 1000, 1200 or 3000. *Central Point Software Inc., 9700 SW Capitol Highway, Suite 100, Portland, OR 97219, (503) 244-5782, \$95 plus \$3 S/H.*

Hip-Pocket Helpers, a collection of 29 utility programs for MS-DOS machines. Requires Tandy 1000, 1200, 2000 or 3000. *ALPS, 1502 County Road 25, Woodland Park, CO 80863, (303) 687-1442, \$79 plus \$3 S/H.*

Inside the Model 100, a book by Carl Oppedahl covering advanced assembly language and BASIC programming and hardware for the Tandy 100. *Webber Systems, Inc., 8437 Mayfield Road, Chesterland, OH 44026, \$19.95.*

Map Builder, generates, displays and prints maps of the continental United States with different colors or shading based on statistical data. Includes coordinates of over 72,000 U.S. towns and cities. Requires Tandy 1000, 1200 or 3000 and graphics. *Geosoft Corporation, 38 Park Street, Vernon, CT 06066, (203) 875-*

7782, \$250 plus \$5 S/H (\$150 additional for "county boundaries" supplement).

PC Tools, utility programs for MS-DOS computers. Includes resident DOS utilities and deleted file recovery. Requires Tandy 1000, 1200 or 3000. *Central Point Software Inc., 9700 SW Capitol Highway, Suite 100, Portland, OR 97219, (503) 244-5782, \$39.95 plus \$3 S/H.*

Personal Profile, a specialized database application for filing information about people. Handles up to 719 people on a single disk. Requires Tandy 100 and Disk/Video Interface. *Software Systems of Atlanta, P.O. Box 4251, Atlanta, GA 30302, \$25.*

Ready!, resident outline processor. System for organizing notes, ideas and facts. Software resides in memory and can be called up while using other programs. Requires Tandy 1000, 1200 or 3000. *Living Videotext, Inc., 2432 Charlestown Road, Mountain View, CA 94043, (415) 964-6300, \$99.95.*

Srike, dynamic spelling checker. Alerts you to possible misspelled words as you type from within many popular word processors. Requires Tandy 1000, 1200 or 3000. *S & K Technology, Inc., 4610 Spotted Oak Woods, San Antonio, TX 78249, (512) 492-3384, \$29.95.*

TRS-80 Model 100 — A User's Guide, goes beyond the standard operator's manual for a guided tour of the features of the Tandy 100. *Tab Books Inc., Blue Ridge Summit, PA 17214, \$15.50.*

By awarding a Seal, the magazine certifies the program does exist, but this does not constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to PCM's reviewers for evaluation.

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Using *BAREAD 2.1*

Bar code listings must be read in numerical order beginning with Line 1 and continuing through the last line of the listing. The computer display is used to prompt you as to which line to scan and give you warning messages should you happen to get out of step.

When you run *BAREAD*, it asks you to scan the first line of the bar code listing. This line contains the name of the program as well as the beginning of the program itself. The computer will sound a high-

pitched beep whenever it's ready for you to scan a line. After a line has been successfully read, you'll hear a lower beep. A "blip-bloop" sound prompts you to turn your attention to the screen for a message. You'll hear this when you accidentally scan a line out of sequence.

After reading the first line, you continue scanning with the second line. Remember to wait for a high beep before scanning and then listen for a low beep to indicate a successful read.

Once the last line of the listing has been scanned, *BAREAD* will return control to the Tandy 100/200 menu screen. Note that the program you just scanned is now in the directory with a .DO extension.

The final step is to convert the .DO text file to a normal BASIC program. This is done quite simply by going to BASIC and loading the file with a command such as LOAD"TEST.D0" (if the program name were TEST). The program will load into BASIC and will be ready to run. To save the program in BASIC's compressed format (.BA extension), you'd type SAVE"TEST" (if the program were named TEST). You may then kill the .DO file with KILL "TEST.D0".

BAREAD 2.1

```
1000 ' *** Initialize ***
1010 ON ERROR GOTO 1040
1020 CLEAR 1000:MAXFILES=2
1030 GOTO 1050
1040 IF ERR=5 THEN RESUME NEXT
1050 ON ERROR GOTO 0
1060 RUNM "B3OF9"
1070 OPEN "WAND:" FOR INPUT AS #1
1080 UC%=-1
1090 PC$="0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ- $+"
1100 DIM RW$(36)
1110 ER$(1)="You must scan line 1 first!"
1120 ER$(2)="You've SKIPPED a line!"
1130 ER$(3)="You've ALREADY SCANNED this line!"
```

```
1140 ER$(4)="Code not PCM2/39 format!"
1150 ER$(5)="Command not applicable here!"
1160 ER$(6)="You cannot skip this line!"
1170 ER$(7)="Selected resume file not in computer!"
1180 ' *** Read Reserved Words List ***
1190 DATA BEEP,CLEAR,CLOSE,DATA,DEFDBL,DEFINT,DEFNG,DEFSTR,ELSE,GOSUB,GOTO
1200 DATA INKEY$,INPUT,INSTR(,LCOPY,LEFT$(,LINE(,LOADM,LPRINT,USING,MAXFILES
1210 DATA MID$(,NEXT,PEEK,POKE,POWER,PRESERVE,PRINT,READ,RESTORE,RETURN,RIGHT$(
1220 DATA SOUND,SPACE$(,STRING$(,THEN
1230 FOR I%=1 TO 36:READ RW$(I%):NEXT I%
1240 ' *** Procedure Begins Here ***
1250 CLS:PRINT@44,"PCM Bar Code Program Reader v2.1"
1260 LINE(20,4)-(219,18),1,B:LINE(22,6)-(217,16),1,B
```



```

1270 NN%=1
1280 GOSUB 1660:IF ER%>0 THEN GOSUB 1620
:GOTO 1280
1290 IF LL%=0 AND INSTR("YN",IL$)>0 THEN
ER%=5:GOSUB 1620:GOTO 1280
1300 IF LL%=0 THEN ON INSTR("ALSR",IL$)
GOTO 1820,1890,1980,2050
1310 IF LL%=1295 THEN 1350
1320 IF LL%<>NN% AND NN%=1 THEN ER%=1:GO
SUB 1620:GOTO 1280
1330 IF LL%<NN% THEN ER%=3:GOSUB 1620:GO
TO 1280
1340 IF LL%>NN% AND NN%>1 THEN ER%=2:GOS
UB 1620:GOTO 1280
1350 IL$=RIGHT$(IL$,19)
1360 IF LL%=1 AND NN%>0 THEN GOSUB 1780
1370 CL$=CL$+IL$
1380 FOR I%=1 TO LEN(CL$)
1390   CH$=MID$(CL$,I%,1)
1400   IF CH$="%" THEN GOSUB 1510:IF NL
% THEN 1470 ELSE GOTO 1440
1410   IF CH$="/" THEN GOSUB 1550:IF NL
% THEN 1470 ELSE GOTO 1440
1420   IF CH$="." THEN UC%=NOT(UC%):GOT
O 1450
1430   IF CH$=>"A" AND CH$<="Z" AND NOT
(UC%) THEN CH$=CHR$(ASC(CH$)+32)
1440   XX$=XX$+CH$:IF RIGHT$(XX$,1)=CHR
$(13) THEN PRINT#2,XX$;:XX$="":UC%=-1
1450 NEXT I%
1460 CL$=""
1470 PRINT@200,SPACE$(80);
1480 IF LL%<>1295 THEN NN%=LL%+1:GOTO 12
80
1490 ' *** Done ***
1500 CLOSE:CALL 61807!:CLEAR 500,HIMEM:M
ENU
1510 ' *** Decode Reserved Word ***
1520 NL%=0:IF I%>LEN(CL$)-1 THEN NL%=-1:
CL$=" ":GOTO 1540
1530 I%=I%+1:CH$=RW$(INSTR(PC$,MID$(CL$,
I%,1)))
1540 RETURN
1550 ' *** Decode Hex and Control Charac
ters ***
1560 NL%=0:IF I%>LEN(CL$)-1 THEN NL%=-1:
CL$=" ":GOTO 1610
1570 I%=I%+1:IF INSTR("/%.",MID$(CL$,I%,
1))>0 THEN CH$=MID$(CL$,I%,1):GOTO 1610
1580 IF I%>LEN(CL$)-1 THEN NL%=-1:CL$=RI
GHT$(CL$,2):GOTO 1610
1590 HX$=MID$(CL$,I%,2):CH$=CHR$(INSTR(
"0123456789ABCDEF",LEFT$(HX$,1))-1)*16+I
NSTR("0123456789ABCDEF",RIGHT$(HX$,1))-1
)
1600 I%=I%+1
1610 RETURN
1620 ' *** Error Codes ***
1630 SOUND 5000,10:SOUND 8000,10:SOUND 5

```

```

000,10
1640 PRINT@220-.5*LEN(ER$(ER%)),ER$(ER%)
;
1650 RETURN
1660 ' *** Get Code Line ***
1670 PRINT@173,"";:PRINT USING "Scan lin
e ###";NN%
1680 IF NN%=-1 THEN PRINT@173,"Scan any
line":GOTO 1700
1690 SOUND 500,5
1700 INPUT#1,IL$:ER%=0
1710 FOR I%=1 TO LEN(IL$)
1720 IF MID$(IL$,I%,1)="!" THEN MID$(IL$
,I%,1)="."
1730 NEXT I%
1740 IF LEN(IL$)<>1 AND LEN(IL$)<>21 THE
N ER%=4:RETURN
1750 IF LEN(IL$)=1 THEN LL%=0:RETURN
1760 LL$=LEFT$(IL$,2):LL%=(INSTR("012345
6789ABCDEFGHIJKLMNQRSTUWXYZ",LEFT$(LL
$,1))-1)*36+INSTR("0123456789ABCDEFGHIJK
LMNQRSTUWXYZ",RIGHT$(LL$,1))-1
1770 RETURN
1780 ' *** Open Program File ***
1790 PN$=LEFT$(IL$,6):IL$=RIGHT$(IL$,LEN
(IL$)-6)
1800 OPEN PN$ FOR OUTPUT AS #2
1810 RETURN
1820 ' *** Abort ***
1830 BEEP:BEEP:BEEP
1840 PRINT@209,"ABORT! Are you sure?";
1850 INPUT#1,AN$
1860 IF INSTR("YN",AN$)=0 THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO'":GOTO 1850
1870 PRINT@200,SPACE$(80);
1880 IF AN$="Y" THEN CLOSE:KILL PN$+"DO
":GOTO 1490 ELSE GOTO 1280
1890 ' *** Skip Line ***
1900 IF NN%=1 THEN ER%=6:GOSUB 1620:GOTO
1280
1910 BEEP:BEEP:BEEP
1920 PRINT@210,"SKIP! Are you sure?"
1930 INPUT#1,AN$
1940 IF INSTR("YN",AN$)=0 THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO'":GOTO 1930
1950 PRINT@200,SPACE$(80);
1960 IF AN$="Y" THEN NN%=NN%+1
1970 GOTO 1280
1980 ' *** Stop & Save ***
1990 BEEP:BEEP:BEEP
2000 PRINT@207,"STOP & SAVE! Are you sur
e?";
2010 INPUT#1,AN$
2020 IF INSTR("YN",AN$)=0 THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO'":GOTO 2010
2030 PRINT@200,SPACE$(80);
2040 IF AN$="Y" THEN 1490 ELSE GOTO 1280
2050 ' *** Resume ***
2060 IF NN%<>1 THEN ER%=5:GOSUB 1620:GOT

```



```

0 1280
2070 PRINT@254,"Resume Mode";
2080 NN%=1:GOSUB 1660
2090 IF LL%=0 THEN ER%=5 ELSE IF LL%<>1
THEN ER%=1
2100 IF ER%>0 THEN GOSUB 1620:GOTO 2060
2110 PN$=MID$(IL$,3,6)

```

```

2120 ON ERROR GOTO 2140
2130 OPEN PN$ FOR INPUT AS #2:GOTO 2170
2140 RESUME 2150
2150 CLOSE #2
2160 ER%=7:GOSUB 1620:GOTO 1270
2170 CLOSE #2:OPEN PN$ FOR APPEND AS #2
2180 NN%=-1:GOTO 1280

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ASM.DO (FROM PAGE 91)

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Abort



Skip Line



Stop & Save



Resume



Yes



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Abort



Skip Line



Stop & Save



Resume



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Abort



Skip Line



Stop & Save



Resume



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Skip Line



Stop & Save



Resume



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Abort



Skip Line



Stop & Save



Resume



Yes



No

ALABAMA Birmingham Florence Greenville Madison	Jefferson News Co. Anderson News Co. M&B Electronics/Radio Shack Madison Books	KENTUCKY Georgetown Louisville Prospect	Goodwin Electronics Hawley-Cooke Bookstores Falsoft, Inc.	OKLAHOMA Oklahoma City	Merit Computers
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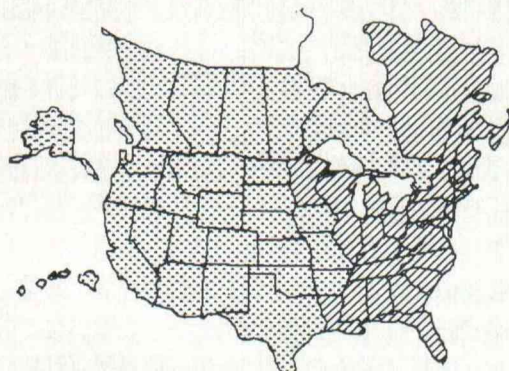
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Advertisers Index

ADVENT PRODUCTS	71
ALPS	116
AMERICAN CRYPTONICS, INC.	55
ATD	36
BEAMAN PORTER INC.	112
CARDINAL SOFTWARE	29
CHEAPWARE	101
COMPUTER PLUS	3
COMPUTER SOLUTIONS	32
DCM DATA PRODUCTS	7
DFW COMPUTER CENTER	26
ENVISION DESIGNS	112
FEDERAL HILL SOFTWARE	103
FORT WORTH COMPUTERS	34
HARD DRIVE SPECIALIST	80
LESCRIPT WORD PROCESSING SYSTEMS	103
LONESTAR SOFTWARE	72
M GLOBAL	110
MARK DATA	118
MARYMAC INDUSTRIES	48
MICRO DESIGNS	1FC
MICRO MAINFRAME	99
NOCONA ELECTRONICS	75, 108
NORTH EDGE SOFTWARE	66
OEDWARE	106
OWL-SERVICES	106
PCM BACK ISSUES	104
PCM ON DISK	49
PERRY COMPUTERS	93
PERSONICS	114
PORTABLE COMPUTER SUPPORT GROUP	63, BC
POWERSOFT	101
PURPLE COMPUTING	42
RADIO SHACK	18, 58
ROSS COMPUTER SERVICES	16
SMALL COMPUTER CO. INC.	5
SOFTWARE SUPPORT	12
SOUTHWESTERN DIGITAL	14
SPI	IBC

TLM SYSTEMS	89
TRUE DATA	48
ULTRA SOFT	9
VCR	41
WIZARD	99

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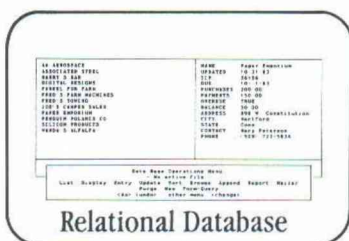
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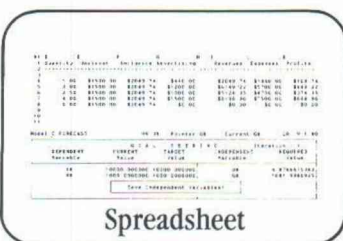
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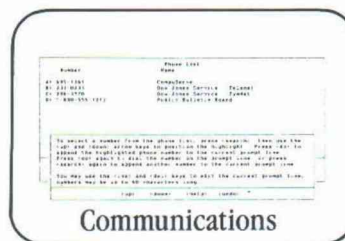
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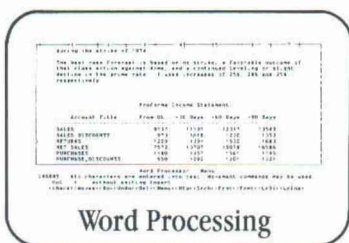
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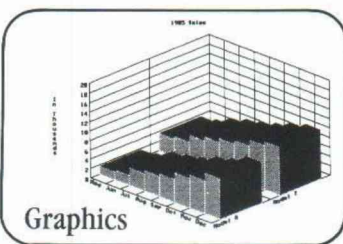
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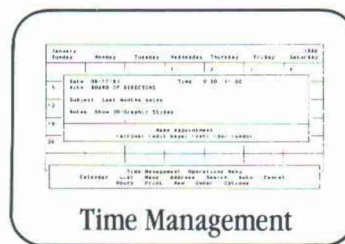
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